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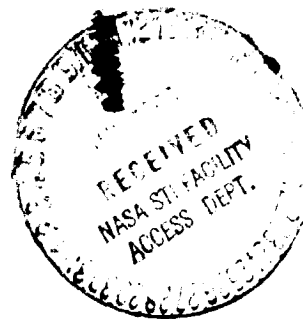
VOLUME VI - COMPUTER DATA

**Power Systems Division
United Technologies Corporation**

January 1980

**Prepared for
NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION
Lewis Research Center
Under Contract DEN3-30**

**for
U.S. DEPARTMENT OF ENERGY
Energy Technology
Fossil Fuel Utilization Division**



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COGENERATION TECHNOLOGY ALTERNATIVES STUDY

FINAL REPORT

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Volume VI
Computer Data

Prepared for

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Energy Technology
Fossil Fuel Utilization Division
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Peter Bolan



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15 Supplementary Notes Final Report, Prepared Under Interagency Agreement EC-77-A-31-1062. Project Managers, G. Barna and J. Dunning, Power Generation and Storage Division, NASA Lewis Research Center, Cleveland, Ohio 44135.					
16 Abstract <p>The Cogeneration Technology Alternatives Study (CTAS) provides data and information in the area of advanced energy conversion systems for industrial cogeneration applications in the 1985-2000 time period. Six current and thirty-six advanced energy conversion systems were defined and combined with appropriate balance-of-plant equipment. Twenty-six industrial processes were selected from among the high energy consuming industries to serve as a frame work for the study. Each conversion system was analyzed as a cogenerator with each industrial plant. Fuel consumption, costs, and environmental intrusion were evaluated and compared to corresponding traditional values. Various cogeneration strategies were analyzed and both topping and bottoming (using industrial by-product heat) applications were included.</p> <p>The advanced energy conversion technologies indicated reduced fuel consumption, costs, and emissions. Typically fuel energy savings of 10 to 25 percent were predicted compared to traditional on-site furnaces and utility electricity. With the variety of industrial requirements, each advanced technology had attractive applications. Overall, fuel cells indicated the greatest fuel energy savings and emission reductions. Gas turbines and combined cycles indicated high overall annual cost savings. Steam turbines and gas turbines produced high estimated returns. In some applications, diesels were most efficient. The advanced technologies used coal-derived fuels, or coal with advanced fluid bed combustion or on-site gasification systems.</p> <p>This volume presents data in the form of computer printouts developed in the study for 3000 energy conversion system - industrial process combinations.</p>					
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VOLUME VI

PREFACE

The Cogeneration Technology Alternatives Study (CTAS) was performed by the National Aeronautics and Space Administration, Lewis Research Center, for the Department of Energy, Division of Fossil Fuel Utilization. CTAS was aimed at providing information which will assist the Department of Energy in establishing research and development funding priorities and emphasis in the area of advanced energy conversion system technology for advanced industrial cogeneration applications. CTAS included two Department of Energy-sponsored/National Aeronautics and Space Administration-contracted studies conducted in parallel by industrial teams along with analyses and evaluations by the National Aeronautics and Space Administration's Lewis Research Center.

This document describes the work conducted by Power Systems Division of United Technologies Corporation under National Aeronautics and Space Administration contract DEN3-30. This United Technologies contractor report is one of a set of reports describing CTAS results. The other reports are the following: Cogeneration Technology Alternatives Study (CTAS) Volume I - Summary NASA TM 81400, Cogeneration Technology Alternatives Study (CTAS) General Electric Final Report NASA CR 159765-159770 and Cogeneration Technology Alternatives Studies (CTAS) Volume II - Comparison and Evaluation of Results, NASA TM 81401.

This United Technologies contractor report for the CTAS study is contained in six volumes:

- | | |
|------------|---|
| Volume I | - Summary Report, DOE/NASA/0030-80/1 NASA CR 159759 |
| Volume II | - Industrial Process Characteristics, DOE/NASA/0030-80/2
NASA CR 159760 |
| Volume III | - Energy Conversion System Characteristics, DOE/NASA/
0030-80/3 NASA CR 159761 |
| Volume IV | - Heat Sources, Balance of Plant, and Auxiliary Systems, DOE/NASA/0030-80/4
159762 |
| Volume V | - Analytical Approach and Results, DOE/NASA/0030-80/5
159763 |
| Volume VI | - Computer Data, DOE/NASA/0030-80/6 NASA CR 159764 |

The results of the computer analysis are summarized in this Volume VI.

Introduction

The objective of the Cogeneration Technology Alternatives Study was to provide data for advanced energy conversion systems in industrial cogeneration applications. The potential technical capabilities of energy conversion systems in the 1985 - 2000 time period have been defined with emphasis on systems using coal, coal-derived fuels or alternate fuels. Industrial process data developed for the large energy consuming industries serve as a framework for the cogeneration applications. Groundrules for the study were established and other necessary equipment (balance-of-plant) was defined. This combination of technical information, energy conversion system data, groundrules, industrial process information and balance-of-plant characteristics have been analyzed to evaluate energy consumption, capital and operating costs and emissions. This volume includes a summary of the computer output.

Table VI-1 identifies the current and advanced energy conversion systems which are the subject of this study. The fuels used by each conversion system are also included. Table VI-2 lists the industrial processes included in the study.

Summary Data

Table VI-3 presents the General Summary results for the analysis of each energy conversion system applied in each industrial application, depicted in Figure VI-1. In Table VI-3 the energy conversion system is designed to meet all of the electrical energy requirements. Thermal deficiencies are met with an auxiliary furnace and excess thermal energy is wasted. This approach or strategy is denoted "Strategy - Match E" at the top of the appropriate summary pages. The energy conversion system is also identified at the top of the General Summary pages. The results for each industry are tabulated separately and include the following items:

$$\text{Fuel Energy Savings Ratio}^* = \frac{\text{Non-Cogeneration Fuel Use} - \text{Cogeneration Fuel Use}}{\text{Non-Generation Fuel Use}}$$

Total fuel savings - in trillion BTU at the National level assuming the fuel savings per unit process output (BTU/ton) is applicable to all plants in the industry.

Utility fuel savings - in trillion BTU at the National level assuming the utility fuel savings are applicable to all plants in the industry.

$$\text{Cost Savings Ratio} = \frac{\text{Non-cogeneration cost} - \text{Cogeneration cost}}{\text{Non-cogeneration cost}}$$

The Cost Savings Ratio is based on levelized annual costs to the industrialist for all energy services.

Cost Savings - Thousand dollars; the levelized annual cost savings at the National level, assuming the cost savings in the model plant are applicable to all plants in the industry.

Capital Costs - thousand dollars; the incremental cost of the equipment and installation to provide the cogeneration energy conversion system.

$$\text{Emissions Savings Ratio} = \frac{\text{Non-cogeneration emissions} - \text{Cogeneration emissions}}{\text{Non-cogeneration emissions}}$$

Emissions Savings -Tons per year saved at the plant location.
-Tons per year saved including the utility emissions.
-Total saved.

ECS Size - Megawatts; energy conversion system electrical rating. If an asterisk is used, the powerplant size is smaller than the minimum size defined. However, the data for these cases are included in the summary.

Note that industries numbered 21 and 22, glass containers and cement, are not included in Table VI-3 since they are only considered for bottoming applications.

*Non-cogeneration fuel use includes utility fuel use.

At the bottom of the General Summary are the total fuel, cost and emission savings for all cases (including negative savings), cases which only save fuel, cost saving cases only, cases which save total emissions, cases providing both fuel and cost savings, and finally, all situations with fuel, cost and emission savings. These savings are at the National level assuming the savings in the various model plants (BTU/ton) are applicable to all plants with that type process.

Following the General Summary for each energy conversion system is the National Summary page which presents the fuel, cost and emission savings which potentially could result if the energy conversion system were used throughout industry and achieved savings consistent with the model plants studied.

The National Fuel Savings Summary presents the fuel savings by type for the cogeneration system compared with the non-cogeneration furnaces at the industrial plant and the fuel consumed by the utility to provide the plant electricity. The only fuel attributed to the utility is coal; and the mixture of fuels used by utilities is not included in this summary. Also, the assumption is made that the energy conversion system uses only one fuel. Negative signs signify an increase in the consumption of that type fuel, generally the conversion system fuel.

If the conversion system employs coal-derived fuel, a final national summary is provided assuming coal-derived fuels or coal are available and used in the non-cogeneration cases as well as in the cogeneration system. In these cases, the national saving of petroleum-based fuels is listed as zero (since coal-derived fuel was assumed substituted) and the principal fuel becomes coal. A conversion efficiency from solid coal to coal-derived liquids of 70 percent was used in preparing this summary.

Summary tables are presented for other cogeneration strategies. Table VI-4 presents the General Summary, the National Summary, and the National Fuel Savings Summaries for the strategy where the conversion system is sized to provide the thermal energy required by the industrial process and electricity is imported or exported from or to the utility grid. This strategy is marked "Match T". In Table VI-5 the summary data for the strategy denoted "optimum" is presented. In this strategy the energy conversion system is selected to provide maximum fuel savings for each cogeneration application. The results with energy conversion systems using heat pumps to enhance heat recovery usefulness are summarized in Table VI-6 and labeled "Match Heat Pump".

The glass container and cement industries provide high temperature heat and are candidates for bottoming cogeneration applications where the industrial waste heat is converted to electricity used by the plant or fed to the utility grid. Table VI-7 presents the summary results for the current steam turbine and the advanced organic rankine cycle conversion systems for these bottoming applications.

Selected Detail Data

Further detail information was developed for each combination of energy conversion system, industrial process, and cogeneration strategy. This detail information is

presented for the twenty cases listed in Table VI-8 which were selected for detailed review in the course of the program. Table VI-9 presents a six-page computer printout for each of the twenty cases. The industry, the energy conversion system, the matching strategy, the annual plant production and the national production for the industrial process for the year being considered are indicated on the first page.

Page two provides energy consumption for the cogeneration and non-cogeneration cases at the national level assuming energy consumption in the model plant is applicable to all plants producing like products. The selected energy conversion system technology is numerically indicated along with the design option selected (i.e., 13-3 is conversion system 13, design option 3). Fuel utilization by type is given for both non-cogeneration and cogeneration cases. The total fuel consumption is listed at the "site" (plant and utility) and source (coal mine) for coal-derived fuels. If a specific industry produces a by-product fuel which can be utilized, the extent of utilization is indicated in the by-product fuel column. The total electric consumption for the industrial process at the national level is presented along with the fuel requirement to produce that electricity. The total fuel energy saved is the difference between the fuel used in the non-cogeneration case (including the utility fuel) and the fuel used in the cogeneration case. The total natural gas and oil saved is defined in the same manner as total fuel saved, except only the oil and gas usage is included.

Page three presents energy utilization ratios and plant level energy data. The fuel energy savings ratio is provided. The ratios U/U_o and F/U_o , and ECS fuel/ U_o are the ratios of the utility fuel required (U), the furnace fuel used (F) and the conversion system fuel used to the energy used by the utility to provide electricity to the industrial plant in the non-cogeneration case. In some industries, a specified fuel is necessary for the production of the final product and any such fuel requirement is indicated, relative to the fuel used at the utility in the non-cogeneration cases, as "specified fuel/ U_o ." The next section of page 3 presents the conversion system design option, size in MWe, and the number of units installed. The electrical efficiency is the electrical output divided by fuel energy input (HHV). The sensible waste heat ratio (A) is defined as the sensible heat available divided by the total heat rejected (exclusive of electricity) by the conversion system.

Two sections follow; the first presents the conversion system available waste heat ratios (R') by thermal category, and the second section presents the recovered waste heat ratio (R) for the specific industrial application.

The total R' is the summation of the individual available waste-heat ratios, excluding hot gas, and represents the maximum available thermal energy as steam and hot water. The recovered waste heat ratio (R) section indicates how much and in which thermal categories the available waste heat was utilized. At the bottom of this page, the parasitic requirements (electrical and thermal) are given along with the coefficient of performance of the heat pump, if utilized.

Page four presents the capital cost accounts for the cogeneration and non-cogeneration plants. These costs are given in 1978 dollars. The cost accounting categories used are as follows:

<u>Cost Category</u>	<u>Category Description</u>
1.0	Fuel/Waste Handling & Storage
2.0	Conversion System Heat Source
3.0	Energy Conversion System
4.0	Thermal Storage
5.0	Supplementary Heat (Furnaces & Boilers)
6.0	Heat Rejection System
7.0	Other Balance-of-Plant Items
8.0	Indirect Costs

These basic cost accounting categories are further subdivided in the printouts. Cogeneration system costs are broken into equipment and installation costs while the non-cogeneration costs are only presented as the total. The cost of borrowing money during the construction period adds to the total indebtedness and is reflected in the capital cost expenditure listed at the bottom of the page.

Page five reports the annual operating costs (in 1978 dollars) and environmental impact of the installation for the typical plant. The operating fuel costs are listed by fuel type for the 1990 start-up year. The cost of any purchased electricity, and systems operation and maintenance are presented in this section. If the cogeneration matching strategy results in the sale of electricity to the grid, the cost credit to the industry appears as a negative number in this category. The next cost section presents the levelized costs over the economic life of the system. The levelized annual cost is comprised of the levelized fixed charges to recover the capital investment and the levelized operating costs.

The cost savings are defined as the cost difference between the non-cogeneration and cogeneration case (non-cogeneration minus cogeneration).

The environmental impact data are presented both at the plant site and at the utility. The pollutant species indicated are sulfur oxides, nitrogen oxides, hydrocarbons, and particulates and are given in tons/year for the typical plant. The emissions savings ratio is based on the summation of emissions at the plant and utility for the cogeneration and non-cogeneration cases. The amount of solid wastes produced (tons/year) by the operation of the non-cogeneration and cogeneration plants is given at the bottom of this page. This value reflects solid wastes from the operation of coal-fired heat sources and waste disposal systems.

Further economic data are presented on the sixth page. The start up year (1990) and base year of cost estimates appear first in the results followed by an indication of the depreciation methodology, the after-tax cost-of-capital, annual fixed charge rate (on invested capital), and the general inflation rate assumed. The subsequent columnar data present specific information about the cogeneration and noncogeneration systems with respect to their capital costs, life-cycle costs, and annularized (levelized) costs. The levelized annual cost savings ratio represents the difference in annularized costs divided by the noncogeneration system costs and is expressed as a decimal value. The data include the cogeneration system payback period and discounted-cash-flow rate-of-return (after taxes). The net present value based on the incremental cash flow differences between the non-cogeneration and cogeneration systems is presented. Finally, the major economic input data for this case is noted at the bottom of the page.

Energy Conversion Systems

The conversion system characteristics are presented in Table VI-10 for the various design options evaluated in the study. This table includes the size range for the conversion system and the electrical and thermal performance in relation to the higher heating value of the fuel consumed for a nominal rating. The predicted emissions are presented. The capital and operating and maintenance costs are listed. The convertor physical size and installation time are included.

Industrial Processes

The energy requirements for each of the industrial processes projected to the year 1985 are given in Table VI-11. A typical or model plant has been postulated for each industrial process and the size of this representative plant and the number of operating days per year are listed. The electrical requirements are listed in terms of consumption and peak demand for both the productive and non-productive days. The thermal requirements are stated in the same terms for each thermal bin. The overall electrical to thermal energy requirement ratio is included. To permit scale up to national levels the projected national annual production is listed along with the share of the 4 digit Standard Industrial Classification represented by the process. Projected fuel use is broken down for the non-cogeneration case.

TABLE VI-1
ENERGY CONSERVATION SYSTEMS

TABLE VI-1

ENERGY CONVERSION SYSTEMS			
<u>Number</u>	<u>Energy Conversion System</u>	<u>Technology</u>	<u>Fuel</u>
CURRENT TECHNOLOGY - TOPPING APPLICATIONS			
1	Steam Turbine		Petroleum, Boiler Grade
2	Steam Turbine		Coal (FGD)
3	Diesel	High Speed	Petroleum Distillate
4	Diesel	Low Speed	Petroleum Boiler Grade
5	Gas Turbine	Direct	Petroleum Distillate
6	Combined Cycle	Direct	Petroleum Distillate
ADVANCED TECHNOLOGY - TOPPING APPLICATION			
7	Steam Turbine		Coal Derived Boiler Grade
8	Steam Turbine		Coal (AFB)
9	Diesel	High Speed	Coal Derived Distillate
10	Diesel	Low Speed	Coal Derived Boiler Grade
11	Diesel	Low Speed	Coal (pulverized)
12	Gas Turbine	Direct	Petroleum Boiler Grade
13	Gas Turbine	Direct	Coal Derived Boiler Grade
14	Gas Turbine	Direct	Coal Derived Low BTU Gas
15	Gas Turbine	Direct	Coal (PFB)
16	Gas Turbine	Indirect	Coal (AFB)
17	Gas Turbine	Closed Cycle	Coal Derived Boiler Grade
18	Gas Turbine	Closed Cycle	Coal (AFB)
19	Steam Injection Gas Turbine	Direct	Petroleum Boiler Grade
20	Steam Injection Gas Turbine	Direct	Coal Derived Boiler Grade
21	Steam Injection Gas Turbine	Direct	Coal (PFB)
22	Steam Injection Gas Turbine	Indirect	Coal (AFB)
23	Combined Cycle	Direct	Petroleum Boiler Grade
24	Combined Cycle	Direct	Coal Derived Boiler
25	Combined Cycle	Direct	Coal (PFB)
26	Combined Cycle	Indirect	Coal (AFB)
27	Fuel Cell	Low Temp	Petroleum Distillate
28	Fuel Cell	Low Temp	Coal Derived Distillate
29	Fuel Cell	High Temp	Petroleum Distillate
30	Fuel Cell	High Temp	Coal Derived Distillate
31	Fuel Cell	High Temp	Coal (Gasifier)
32	Stirling		Coal Derived Boiler Grade
33	Stirling		Coal (AFB)
34	Thermionics		Coal Derived Boiler Grade
35	Thermionics Compound		Coal Derived Boiler Grade
CURRENT TECHNOLOGY - BOTTOMING APPLICATIONS			
36	Steam Turbine		By-Product Heat
ADVANCED TECHNOLOGY - BOTTOMING APPLICATIONS			
37	Organic Rankine		By-Product Heat

TABLE VI-2
INDUSTRIAL PLANTS/PROCESSES

TABLE VI - 2

INDUSTRIAL PLANTS/PROCESSES	
<u>Standard Industrial Classification</u>	
20 Food	1. Meat Packing 2. Bakery 3. Malt Beverages
22 Textiles	4. Textile Mill
24 Lumber	5. Saw Mill
26 Paper	6. Newsprint 7. Writing Paper 8. Corrugated Paper 9. Boxboard
28 Chemicals	10. Chlorine 11. Alumina 12. Low Density Polyethylene 13. High Density Polyethylene 14. Polyvinyl Chloride 15. Butadiene Rubber 16. Nylon 17. Styrene 18. Ethylene
29 Petroleum	19. Refinery
30 Rubber	20. Tires
32 Stone and Glass	21. Bottles 22. Portland Cement
33 Primary Metals	23. Integrated Steel Mill 24. Iron Foundry 25. Copper
37 Transportation Equipment	26. Motor Vehicles

TABLE VI-3
SUMMARY RESULTS
MATCH ELECTRIC STRATEGY

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E				EMISSIONS SAVINGS				01	
NO. 1 CURRENT TECHNOLOGY,STEAM TURBINE,615 PSIA(EXT),PET. B.G.										CAPITAL COST \$000		SAVINGS RATIO		PLANT UTILITY		TONS PER YEAR		ECS SIZE	
INDUSTRY										FUEL ENERGY TOTAL		UTILITY SAVINGS		FUEL SAVINGS		TOTAL		TOTAL	
										SAVINGS RATIO		RATIO		RATIO		TOTAL		TOTAL	
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										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS		SAVINGS RATIO		FUEL SAVINGS		TOTAL		TOTAL	
										FUEL SAVINGS									

YEAR : 1990
 NO. 1 CURRENT TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT), PET. B.G. *** STRATEGY MATCH-E 07

NATIONAL SUMMARY

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS 10**12 BTU		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		
	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	PLANT	UTILITY	TOTAL
TOTAL -- ALL	-789	9018	-11569873	75756752	-6783758	9794864	3011092				
FUEL SAVINGS CASES ONLY	861	2869	-541276	25570000	-1704132	3221261	1517135				
COST SAVINGS CASES ONLY	459	1172	1010074	6963758	-483432	1246082	762651				
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0				
FUEL & COST SAVINGS CASES	459	1172	1010074	6963758	-483432	1246082	762651				
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0				

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED FUEL		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM
TOTAL -- ALL	-789	9018	-11569873	75756752	-6783758	9794864
FUEL SAVINGS CASES ONLY	861	2869	-541276	25570000	-1704132	3221261
COST SAVINGS CASES ONLY	459	1172	1010074	6963758	-483432	1246082
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	459	1172	1010074	6963758	-483432	1246082
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED FUEL		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM
TOTAL -- ALL	-789	9018	-11569873	75756752	-6783758	9794864
FUEL SAVINGS CASES ONLY	861	2869	-541276	25570000	-1704132	3221261
COST SAVINGS CASES ONLY	459	1172	1010074	6963758	-483432	1246082
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	459	1172	1010074	6963758	-483432	1246082
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED FUEL		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM
TOTAL -- ALL	-789	9018	-11569873	75756752	-6783758	9794864
FUEL SAVINGS CASES ONLY	861	2869	-541276	25570000	-1704132	3221261
COST SAVINGS CASES ONLY	459	1172	1010074	6963758	-483432	1246082
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	459	1172	1010074	6963758	-483432	1246082
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

Power Systems Division

FCR-1333

INDUSTRY	CTAS GENERAL SUMMARY - PROCESS LEVEL				NO. 2 CURRENT TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL				*** STRATEGY MATCH-E				EMISSIONS SAVINGS				01 ECS SIZE (MM)
	FUEL SAVINGS RATIO	FUEL SAVINGS	UTILITY SAVINGS	COAL COST RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	EMISSIONS TONS PER YEAR	PLANT UTILITY	SAVINGS TOTAL	EMISSIONS TONS PER YEAR	PLANT UTILITY	SAVINGS TOTAL	EMISSIONS TONS PER YEAR	PLANT UTILITY	SAVINGS TOTAL	
NO.01 MEAT PACKING	-0.044	-4.6	48.0	-0.187	-72713	1981993	-0.196	-68691	51337	-17354	4.61						
NO.02 BAKING	-0.147	-5.9	15.7	-0.516	-73706	815545	-0.326	-24369	16786	-7583	0.17*						
NO.03 MALT BEVERAGE	0.084	6.0	18.9	0.089	23250	871071	-0.094	-25482	20256	-5226	1.40						
NO.04 WOVEN FABRIC MILL	-0.436	-47.0	77.8	-0.560	-222201	2573503	-0.450	-129402	83274	-46128	2.07						
NO.05 SAW MILL	-0.371	-41.6	91.7	-1.632	-835054	9238790	-0.399	-143049	98163	-44886	0.21*						
NO.06 NEWSPRINT MILL	-0.234	-28.1	91.4	0.024	10628	914154	-0.283	-129205	96292	-32913	74.50						
NO.07 WRITING PAPER MILL	-0.036	-4.0	59.1	0.122	59963	1147846	-0.214	-99548	74301	-25247	19.34						
NO.08 CORRUGATED PAPER	0.135	68.5	205.4	0.302	566101	2998703	-0.084	-254566	218524	-36042	48.25						
NO.09 BOX BOARD	0.106	16.4	72.5	0.259	148834	1047284	-0.092	-89279	76864	-12415	40.74						
NO.10 CHLORINE	-0.172	-115.3	499.1	0.049	122392	5428886	-0.240	-699705	540818	-158886	48.25						
NO.11 ALUMINA	-0.173	-19.2	32.0	0.003	1512	579320	-0.248	-55940	34273	-21667	17.79						
NO.12 LOW DENS. POLYETHYL	-0.346	-60.3	148.6	-0.149	-94382	1975074	-0.380	-226387	159056	-67331	19.64						
NO.13 HI DENS. POLYETHYL	-0.327	-25.0	53.7	-0.151	-42423	915066	-0.334	-82139	57565	-24573	9.98						
NO.14 POLYVINYL CHLORIDE	-0.312	-35.9	73.7	-0.160	-67678	1462161	-0.333	-114725	78782	-35943	7.15						
NO.15 STYRENE-BUT. RUB.	-0.038	-0.7	4.2	0.034	2444	174231	-0.140	-6497	4463	-2034	1.55						
NO.16 NYLON	-0.380	-11.0	20.7	-0.271	-28929	444609	-0.392	-33131	22168	-10964	4.16						
NO.17 STYRENE	-0.049	-9.1	7.0	0.155	105452	622119	-0.118	-20680	7532	-13149	3.66						
NO.18 ETHYLENE	-0.002	-1.9	16.2	0.359	1456955	1693528	-0.040	-48439	16628	-31811	2.64						
NO.19 PETROLEUM REFINING	-0.025	-102.6	293.3	0.335	4935978	7462853	-0.069	-520256	313958	-206297	20.37						
NO.20 TIRES	-0.218	-23.8	55.8	-0.130	-52583	1523830	-0.351	-93891	59693	-34188	7.47						
NO.23 INTEGRATED STEEL	-0.038	-171.0	467.4	-0.026	-276010	7890294	-0.035	-693589	521814	-171775106.67							
NO.24 GRAY IRON FOUNDRY	-0.214	-33.2	74.2	0.047	26468	1133140	-0.278	-117059	79390	-37669	18.56						
NO.25 COPPER	-0.223	-35.7	82.6	-0.092	-54208	1968663	-0.364	-140379	88446	-51932	5.95						
NO.26 MOTOR VEHICLE	-0.191	-39.9	93.8	-0.144	-109272	2382154	-0.418	-167502	100465	-67037	11.00						
TOTAL -- ALL		-725	2623		5530915	57234704		-393894	2820843	-1163049							
FUEL SAVINGS CASES ONLY		91	297		739185	4917053		-369327	315644	-53683							
COST SAVINGS CASES ONLY		-223	1373		7459976	24073120		-2066653	1493297	-583355							
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0							
FUEL & COST SAVINGS CASES		91	297		739185	4917058		-369327	315644	-53683							
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0							

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO. 2 CURRENT TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT.), COAL *** STRATEGY MATCH-E 07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS		
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	\$000	\$000	\$000	PLANT	UTILITY	TOTAL
TOTAL -- ALL	-2241	9018			20569856	177066784			-13736237	9794864	-3941362
FUEL SAVINGS CASES ONLY	359	1172			2966513	18205680			-1454142	1246082	-208060
COST SAVINGS CASES ONLY	-887	5732			24943840	99069072			-8690375	6277659	-2412712
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0	0
FUEL & COST SAVINGS CASES	359	1172			2966513	18205680			-1454142	1246082	-208060
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10*12 BTU		COAL DERIVED		TOTAL		
	NATURAL GAS	PETROLEUM	BOILER FUEL	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	6082	0	0	0	0	-24749	2197
FUEL SAVINGS CASES ONLY	800	0	539	0	0	0	0	-990	10
COST SAVINGS CASES ONLY	12593	-425	5304	0	0	0	0	-19800	1440
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	800	0	539	0	0	0	0	-990	10
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	0	0	-24749	2197	-2241
FUEL SAVINGS CASES ONLY	800	0	539	0	0	0	0	-990	10	358
COST SAVINGS CASES ONLY	12593	-425	5304	0	0	0	0	-19800	1440	-887
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	800	0	539	0	0	0	0	-990	10	358
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	0	0	-24749	2197	-2241
FUEL SAVINGS CASES ONLY	800	0	539	0	0	0	0	-990	10	358
COST SAVINGS CASES ONLY	12593	-425	5304	0	0	0	0	-19800	1440	-887
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	800	0	539	0	0	0	0	-990	10	358
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL										01			
INDUSTRY	NO. 3 CURRENT TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.	FUEL ENERGY TOTAL		UTILITY FUEL		SAVINGS RATIO		SAVINGS DOLLARS \$000		*** STRATEGY MATCH-E		EMISSIONS SAVINGS	
		SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	CAPITAL COST \$000	SAVINGS RATIO	PLANT	UTILITY TOTAL
NO.01 MEAT PACKING	0.255	26.8	48.0	-0.060	-0.060	-23227	549275	-0.412	-86274	51337	-34937	1.43	
NO.02 BAKING	0.135	5.4	15.7	-0.199	-0.199	-28404	135663	-0.602	-30409	16786	-13623	0.16*	
NO.03 MALT BEVERAGE	0.085	6.0	18.9	-0.091	-0.091	-24104	196479	-0.334	-37623	20256	-17367	1.32	
NO.04 WOVEN FABRIC MILL	0.210	22.7	77.8	-0.216	-0.216	-85644	582630	-0.695	-153185	83275	-69910	1.28	
NO.05 SAW MILL	0.255	28.6	91.7	-0.185	-0.185	-94569	1559535	-0.723	-178536	98163	-80373	0.20*	
NO.06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0.000	0	0	0.000	17873	96292	114165	0.00	
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0.000	0	0	0.000	39091	74301	113392	0.00	
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0.000	0	0	0.000	189040	218524	407564	0.00	
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0.000	0	0	0.000	51753	76864	128618	0.00	
NO.10 CHLORINE	0.000	0.0	499.1	0.000	0.000	0	0	0.000	108046	540819	648865	0.00	
NO.11 ALUMINA	0.000	0.0	32.0	0.000	0.000	0	0	0.000	50357	34273	84630	0.00	
NO.12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0.000	-52199	336872	-0.674	-106000	159056	175345	0.00	
NO.13 HI DENS. POLYETHYL	0.205	15.7	53.7	-0.186	-0.186	-72028	475375	-0.633	-145146	78782	-48435	1.55	
NO.14 POLYVINYL CHLORIDE	0.188	21.7	73.7	-0.170	-0.170	-4723	39598	-0.281	-8324	4463	-3861	1.47	
NO.15 STYRENE-BUT. RUB.	0.077	1.5	4.2	-0.065	-0.065	-19194	123534	-0.679	-20764	22168	-18596	1.55	
NO.16 NYLON	0.209	6.0	20.7	-0.180	-0.180	-51369	174594	-0.087	-16304	7532	-8772	1.35	
NO.17 STYRENE	0.009	1.6	7.0	-0.076	-0.076	-112781	739397	-0.051	-52067	16620	-36239	1.56	
NO.18 ETHYLENE	0.019	21.9	16.2	-0.028	-0.028	0	0	0.000	2396786	313959	2710745	0.00	
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0.000	-64012	492304	-0.537	-109935	59692	-50243	1.55	
NO.20 TIRES	0.153	16.7	55.8	-0.153	-0.153	0	0	0.000	4342768	521814	4864582	0.00	
NO.23 INTEGRATED STEEL	0.000	0.0	437.4	0.000	0.000	0	0	0.000	50453	79390	129844	0.00	
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0.000	-86710	596747	-0.548	-163555	88446	-75108	1.58	
NO.25 COPPER	0.154	24.7	82.6	-0.147	-0.147	0	0	0.000	53626	100465	154091	0.00	
NO.26 MOTOR VEHICLE	0.000	0.0	93.8	0.000	0.000	-718964	6001997	-0.118921	-1128921	605093	-523328		
TOTAL -- ALL		199	2623			-718964	6001997						
FUEL SAVINGS CASES ONLY		199	566			-718964	6001997						
COST SAVINGS CASES ONLY		0	0			0	0						
EMISSIONS SAVINGS CASE ONLY		0	2057			0	0						
FUEL & COST SAVINGS CASES		0	0			0	0						
FUEL, COST & EMISSION SAVING		0	0			0	0						

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 3 CURRENT TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS	COST SAVINGS		CAPITAL COST \$000	EMISSIONS SAVINGS		
	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000			PLANT	UTILITY	TOTAL
TOTAL -- ALL	636	9018		-2516783	18757776		12436191	9794866	22231056
FUEL SAVINGS CASES ONLY	636	1631		-2516783	18757776		-3359445	1740226	-1618226
COST SAVINGS CASES ONLY	0	0		0	0		0	0	0
EMISSIONS SAVINGS CASE ONLY	0	7387		0	0		15794644	8054646	23949280
FUEL & COST SAVINGS CASES	0	0		0	0		0	0	0
FUEL, COST & EMISSION SAVING	0	0		0	0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		TOTAL FUEL
	NATURAL GAS	PETROLEUM	DISTILLATE	COAL DERIVED	
	14711	-1575	-3397	0	15579
	7541	-1575	-7281	0	1829
	7170	0	3893	0	13749
	0	0	0	0	0
	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14711	-1575	-3397	0	15579	2197	636
FUEL SAVINGS CASES ONLY	7541	-1575	-7281	0	1829	122	636
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	7170	0	3893	0	13749	2075	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14711	-1575	-3397	0	15579	2197	636
FUEL SAVINGS CASES ONLY	7541	-1575	-7281	0	1829	122	636
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	7170	0	3893	0	13749	2075	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL																
INDUSTRY	NO. 4 CURRENT TECHNOLOGY	FUEL ENERGY TOTAL				PETROLEUM BOILER GRADE				*** STRATEGY MATCH-E		EMISSIONS SAVINGS		ECS SIZE		
		SAVINGS RATIO	SAVINGS	FUEL	SAVINGS RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	SAVINGS	PLANT	UTILITY	SAVINGS PER YEAR	SAVINGS TOTAL	PER YEAR	PER YEAR	
NO. 01 MEAT PACKING		0.229	24.1	48.0	-0.051	-19963	1017276	-0.411	-86187	51337	-34850	4.30*				
NO. 02 BAKING		0.131	5.2	15.7	-0.220	-31451	358714	-0.577	-29845	16786	-13059	0.16*				
NO. 03 MALT BEVERAGE		0.083	5.9	18.9	-0.063	-16697	356390	-0.321	-36939	20256	-16682	1.32*				
NO. 04 WOVEN FABRIC MILL		0.131	14.1	77.8	-0.209	-82783	1221693	-0.722	-15560	83275	-72545	1.93*				
NO. 05 SAW MILL		0.285	32.0	91.7	-0.222	-113729	3021426	-0.670	-172607	98163	-74444	0.20*				
NO. 06 NEWSPRINT MILL		0.244	29.3	91.4	0.034	15033	799911	-0.657	-171308	96292	-75016	27.83				
NO. 07 WRITING PAPER MILL		0.189	21.1	59.1	0.031	15071	728252	-0.498	-130720	74301	-56419	18.09				
NO. 08 CORRUGATED PAPER		0.191	96.8	205.4	0.070	132296	2145740	-0.371	-369662	218524	-151138	22.75				
NO. 09 BOX BOARD		0.211	32.7	72.5	0.077	44065	730028	-0.419	-130749	76864	-53885	25.53				
NO. 10 CHLORINE		0.234	150.6	499.1	0.014	35347	4680342	-0.659	-968220	540818	-427409	22.57				
NO. 11 ALUMINA		0.013	1.4	32.0	-0.076	-33789	362544	-0.387	-67043	34273	-32770	16.58				
NO. 12 LOW DENS. POLYETHYL		0.141	24.6	148.6	-0.116	-74073	1417530	-0.798	-298899	159056	-139843	18.33				
NO. 13 HI DENS. POLYETHYL		0.136	10.4	53.7	-0.095	-26561	568869	-0.693	-107378	57565	-49813	9.36				
NO. 14 POLYVINYL CHLORIDE		0.141	16.2	73.7	-0.082	-34921	836341	-0.639	-145837	78782	-67055	6.70*				
NO. 15 STYRENE-EUT. RUB.		0.076	1.4	4.2	-0.035	-2566	69495	-0.271	-8176	4463	-3712	1.47*				
NO. 16 NYLON		0.157	4.5	20.7	-0.089	-9499	233760	-0.665	-40938	22168	-18770	3.88*				
NO. 17 STYRENE		0.007	1.3	7.0	-0.071	-48005	215604	-0.086	-16267	7532	-8735	3.39*				
NO. 18 ETHYLENE		0.022	26.0	16.2	-0.015	-61373	733195	-0.039	-44741	16628	-28114	3.42*				
NO. 19 PETROLEUM REFINING		0.054	221.3	293.3	0.002	29216	4698475	-0.092	-563098	313958	-249140	20.16				
NO. 20 TIRES		0.148	16.2	55.8	-0.073	-29494	833193	-0.517	-108033	59692	-48341	6.97*				
NO. 23 INTEGRATED STEEL		0.018	83.5	487.4	-0.021	-227657	7422055	-0.060	-909025	521814	-387210	28.53				
NO. 24 GRAY IRON FOUNDRY		0.159	24.6	74.2	-0.017	-9725	796134	-0.490	-143051	79390	-63660	17.35				
NO. 25 COPPER		0.149	23.9	82.6	-0.050	-29204	1039128	-0.528	-160761	88446	-72315	5.56*				
NO. 26 MOTOR VEHICLE		0.128	26.6	93.8	-0.105	-79885	1365959	-0.532	-182482	100465	-82817	10.14				

TOTAL -- ALL			900	2623		-680246	35651872		-5047785	2820843	-2226937					
FUEL SAVINGS CASES ONLY			900	2623		-680246	35651872		-5047785	2820843	-2226937					
COST SAVINGS CASES ONLY			558	1821		271028	13782749		-2333764	1320757	-1013006					
EMISSIONS SAVINGS CASE ONLY			0	0		0	0		0	0	0					
FUEL & COST SAVINGS CASES			558	1821		271028	13782749		-2333764	1320757	-1013006					
FUEL, COST & EMISSIONS SAVING			0	0		0	0		0	0	0					

- CO-GENERATION TECHNOLOGY, ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

P.O. & CURRENT TECHNOLOGY, DIESEL, LOW SPEED, PETROLEUM BOILER GRADE

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL	COST SAVINGS		CAPITAL COST \$000	EMISSIONS SAVINGS		
	10**12 BTU	10**12 BTU	SAVINGS	DOLLARS \$000	\$000	\$000	PLANT	UTILITY	TOTAL
TOTAL -- ALL	3039	9018		-1624199	112776160		-17633472	9794864	-7838602
FUEL SAVINGS CASES ONLY	3039	9018		-1624199	112776160		-17633472	9794864	-7838602
COST SAVINGS CASES ONLY	2055	5057		1303632	53996016		-9790661	5560607	-4230046
EMISSIONS SAVINGS CASE ONLY	0	0		0	0		0	0	0
FUEL & COST SAVINGS CASES	2055	5057		1303632	53996016		-9790661	5560607	-4230046
FUEL, COST & EMISSION SAVING	0	0		0	0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	-21190	0	0	0	7804	2197
FUEL SAVINGS CASES ONLY	14654	-425	-21190	0	0	0	7804	2197
COST SAVINGS CASES ONLY	5027	0	-10556	0	0	0	6274	1309
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	5027	0	-10556	0	0	0	6274	1309
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	-21190	0	0	0	7804	2197	3039
FUEL SAVINGS CASES ONLY	14654	-425	-21190	0	0	0	7804	2197	3039
COST SAVINGS CASES ONLY	5027	0	-10556	0	0	0	6274	1309	2055
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	5027	0	-10556	0	0	0	6274	1309	2055
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	-21190	0	0	0	7804	2197	3039
FUEL SAVINGS CASES ONLY	14654	-425	-21190	0	0	0	7804	2197	3039
COST SAVINGS CASES ONLY	5027	0	-10556	0	0	0	6274	1309	2055
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	5027	0	-10556	0	0	0	6274	1309	2055
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CIAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 5 CURRENT TECHNOLOGY	GAS TURBINE, DIRECT FIRED, PETROLEUM DIST		FUEL ENERGY TOTAL		SAVINGS FUEL		SAVINGS FUEL		*** STRATEGY MATCH-E		ECS SIZE (MW)
		SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	SAVINGS PLANT UTILITY TOTAL		
NO. 01 MEAT PACKING	0.255	26.7	43.0	0.002	677	414569	0.540	-4848	51337	46489	4.27	
NO. 02 BAKING	0.144	5.8	15.7	-0.216	-30801	201550	0.602	-3171	16786	13615	0.16*	
NO. 03 MALT BEVERAGE	0.157	11.2	18.9	-0.076	-19903	176927	0.445	2860	20256	23116	1.20	
NO. 04 BAKEN FABRIC MILL	0.123	13.2	77.8	-0.225	-89280	441606	0.571	-25900	83274	57375	1.90	
NO. 05 SAW MILL	0.011	1.2	91.7	-0.434	-247495	2255984	0.530	-39251	90163	58912	0.19*	
NO. 06 NEWSPRINT MILL	0.211	25.3	91.4	-0.057	-24988	214490	0.616	-25961	96292	70330	68.60	
NO. 07 WRITING PAPER MILL	0.292	32.6	59.1	0.074	36383	323763	0.591	-7294	74301	67007	17.83	
NO. 08 CORRUGATED PAPER	0.221	111.8	205.4	0.050	93984	1049997	0.476	-24587	218524	193937	45.12	
NO. 09 BOX BOARD	0.254	39.3	72.5	0.059	34157	358280	0.533	-8369	76864	68495	37.95	
NO. 10 CHLORINE	0.296	198.1	499.1	0.043	106375	1176189	0.655	-116012	540818	424886	44.55	
NO. 11 ALUMINA	0.000	9.1	32.0	-0.036	-16025	153099	0.292	-9525	34273	24749	16.30	
NO. 12 LOW DENS. POLYETHYL	0.110	19.1	148.6	-0.203	-128692	367137	0.584	-56739	159056	102317	18.14	
NO. 13 HI DENS. POLYETHYL	0.267	20.4	53.7	0.003	724	159391	0.633	-12044	57565	45521	9.21	
NO. 14 POLYVINYL CHLORIDE	0.308	35.5	73.7	0.058	24547	257520	0.639	-11741	78782	67041	6.58	
NO. 15 STYRENE-BUT. RUB.	0.138	2.6	4.2	-0.047	-3409	33876	0.366	554	4463	5018	1.40	
NO. 16 NYLON	0.213	6.2	20.7	-0.074	-7846	73101	0.609	-5476	22168	16592	3.83	
NO. 17 STYRENE	0.010	1.8	7.0	-0.001	-55269	164750	0.048	-2645	7532	4887	3.33	
NO. 18 ETHYLENE	0.010	12.0	16.2	-0.051	-205977	940015	0.011	-9064	16628	7564	4.71	
NO. 19 PETROLEUM REFINING	0.065	263.8	293.3	-0.029	-423297	3923418	0.135	51739	313958	365697	21.34	
NO. 20 TIRES	0.271	29.7	55.8	0.045	18154	300005	0.567	-6821	59693	53072	6.84	
NO. 23 INTEGRATED STEEL	0.045	203.9	487.4	0.032	344442	3517163	0.081	-128330	521814	393484	98.23	
NO. 24 GRAY IRON FOUNDRY	0.141	21.9	74.2	-0.040	-33529	228955	0.444	-21758	79390	57632	17.20	
NO. 25 COPPER	0.274	43.9	82.6	0.048	27950	375634	0.571	-10257	88446	78189	5.45	
NO. 26 MOTOR VEHICLE	0.239	50.0	93.8	0.006	4208	461788	0.577	-11519	100465	88946	9.96	
TOTAL -- ALL		1185	2623		-595611	17569168		-485959	2828843	2334884		
FUEL SAVINGS CASES ONLY		1185	2623		-595611	17569168		-485959	2828843	2334884		
COST SAVINGS CASES ONLY		792	1731		691802	8394289		-341623	1866608	1526956		
EMISSIONS SAVINGS CASE ONLY		278	316		-446610	4130221		55153	338678	393831		
FUEL & COST SAVINGS CASES		792	1731		691802	8394286		-341623	1866608	1526936		
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO. 5 CURRENT TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETROLEUM DIST *** STRATEGY MATCH-E 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		TOTAL UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS ----- TONS PER YEAR -----	
	FUEL	SAVINGS	SAVINGS	SAVINGS	DOLLARS	\$000	COST	\$000	PLANT	UTILITY
TOTAL -- ALL	3916	5018			-2357048		53403695		-1855516	9794566
FUEL SAVINGS CASES ONLY	3916	5018			-2357048		53403695		-1855516	9794566
COST SAVINGS CASES ONLY	2518	5269			2196303		25145136		-935487	5810599
EMISSIONS SAVINGS CASE ONLY	540	619			-666160		6024809		107360	662396
FUEL & COST SAVINGS CASES	2518	5269			2196303		25145136		-935487	5810599
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

FUEL SAVINGS		10**12 BTU		TOTAL	
NATURAL PETROLEUM		COAL		OTHER	
GAS	DISTILLATE	PETROLEUM	BOILER FUEL	COAL	OTHER
SAVINGS	SAVINGS	SAVINGS	SAVINGS	SAVINGS	SAVINGS

SITE PLUS UTILITY					
TOTAL -- ALL	14654	-10911	-9927	0	7804
FUEL SAVINGS CASES ONLY	14654	-10911	-9927	0	7804
COST SAVINGS CASES ONLY	3026	-5105	404	0	3480
EMISSIONS SAVINGS CASE ONLY	3037	-1604	-4089	0	1015
FUEL & COST SAVINGS CASES	3026	-5105	404	0	3480
FUEL, COST & EMISSION SAVING	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION					
TOTAL -- ALL	14654	-10911	-9927	0	7804
FUEL SAVINGS CASES ONLY	14654	-10911	-9927	0	7804
COST SAVINGS CASES ONLY	3026	-5105	404	0	3480
EMISSIONS SAVINGS CASE ONLY	3037	-1604	-4089	0	1015
FUEL & COST SAVINGS CASES	3026	-5105	404	0	3480
FUEL, COST & EMISSION SAVING	0	0	0	0	0

Power Systems Division

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CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 6 CURRENT TECHNOLOGY, COMB. CYCLE, DIR. FIRED, PETROLEUM DIST.	FUEL ENERGY TOTAL			UTILITY COST SAVINGS			*** STRATEGY MATCH-E		EMISSIONS SAVINGS		01 ECS SIZE (MM)
		SAVINGS RATIO	SAVINGS FUEL	SAVINGS TOTAL	SAVINGS RATIO	COST DOLLARS \$000	SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	
NO. 01 MEAT PACKING		0.143	15.6	48.0	-0.162	-63094	767177	0.433	-14610	51337	36728	4.33*
NO. 02 BAKING		0.126	5.1	15.7	-0.485	-69294	607328	0.538	-4612	16786	12174	0.16*
NO. 03 MALT BEVERAGE		0.087	6.2	18.9	-0.115	-30178	350826	0.273	-6081	20256	14175	1.32*
NO. 04 WOVEN FABRIC MILL		0.220	23.7	77.8	-0.235	-93166	1089703	0.595	-23451	83274	59823	1.92*
NO. 05 SAW MILL		0.293	32.9	91.7	-0.678	-346945	4670155	0.664	-24337	98163	73026	0.20*
NO. 06 NEWSPRINT MILL		0.242	29.1	91.4	-0.022	-9455	353646	0.614	-26247	96292	70045	69.56
NO. 07 WRITING PAPER MILL		0.166	18.4	59.1	-0.038	-18741	425774	0.470	-21015	74301	53286	18.12
NO. 08 CORRUGATED PAPER		0.124	62.8	205.4	-0.028	-52491	1199848	0.377	-64884	218524	153640	45.83
NO. 09 BOX BOARD		0.142	22.0	72.5	-0.031	-17923	415943	0.422	-22553	76864	54312	38.55
NO. 10 CHLORINE		0.280	187.3	499.1	0.012	29385	2056371	1.633	-129972	540818	410847	45.01
NO. 11 ALUMINA		0.019	2.1	32.0	-0.091	-40056	210916	0.223	-15392	34273	18882	16.55
NO. 12 LOW DENS. POLYETHYL		0.258	45.0	148.6	-0.064	-41116	710312	0.652	-44714	159056	114342	18.25
NO. 13 HI DENS. POLYETHYL		0.215	16.4	53.7	-0.074	-20656	323706	0.574	-16311	57565	41254	9.32*
NO. 14 POLYVINYL CHLORIDE		0.197	22.7	73.7	-0.088	-37743	540224	0.537	-22422	78782	56360	6.67*
NO. 15 STYRENE-BUT. RUB.		0.079	1.5	4.2	-0.075	-5405	68765	0.224	-1394	4463	3069	1.47*
NO. 16 NYLON		0.219	6.3	20.7	-0.110	-11685	164364	0.581	-6235	22168	15933	3.87*
NO. 17 STYRENE		0.000	0.0	7.0	-0.083	-56096	197372	0.017	-5789	7532	1743	3.40*
NO. 18 ETHYLENE		0.004	4.1	16.2	-0.051	-206307	1044889	-0.008	-22034	16628	-5407	4.79*
NO. 19 PETROLEUM REFINING		0.043	177.7	293.3	-0.028	-409195	4459846	0.084	-85992	313958	227966	21.94
NO. 20 TIRES		0.160	17.5	55.8	-0.095	-38306	547290	0.456	-17033	59693	42859	6.95*
NO. 23 INTEGRATED STEEL		0.030	135.0	487.4	-0.003	-31685	4344411	0.074	-160735	521814	361079	99.46
NO. 24 GRAY IRON FOUNDRY		0.227	35.2	74.2	0.019	10819	414831	0.492	-15501	79390	63889	17.30
NO. 25 COPPER		0.162	25.9	82.6	-0.089	-52358	715894	0.458	-25755	88446	62692	5.54*
NO. 26 MOTOR VEHICLE		0.141	29.3	93.8	-0.109	-82667	783650	0.464	-28918	100465	71547	10.12

TOTAL -- ALL			922	2623		-1693052	26471184		-805985	2820843	2014859	
FUEL SAVINGS CASES ONLY			922	2623		-1693852	26471184		-805985	2820843	2014859	
COST SAVINGS CASES ONLY			223	573		40204	2471201		-145473	620209	474736	
EMISSIONS SAVINGS CASE ONLY			0	0		0	0		0	0	0	
FUEL & COST SAVINGS CASES			223	573		40204	2471201		-145473	620209	474736	
FUEL, COST & EMISSION SAVING			0	0		0	0		0	0	0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 6 CURRENT TECHNOLOGY, COMB. CYCLE, DIR. FIRED, PETROLEUM DIST.

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT UTILITY	TOTAL
TOTAL -- ALL	2945	9018			-5656266		78243984		-2922629	9794866 6872223
FUEL SAVINGS CASES ONLY	2945	9018			-5656266		78243984		-2922629	9794866 6872223
COST SAVINGS CASES ONLY	489	1265			86848		5421525		-322120	1368897 1046777
EMISSIONS SAVINGS CASE ONLY	0	0			0		0		0	0
FUEL & COST SAVINGS CASES	489	1265			86848		5421525		-322120	1368897 1046777
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER FUEL
TOTAL -- ALL	14654	-8252	-13457	0	0	0	7804	2197
FUEL SAVINGS CASES ONLY	14654	-8252	-13457	0	0	0	7804	2197
COST SAVINGS CASES ONLY	175	-1097	-165	0	0	0	1498	78
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	175	-1097	-165	0	0	0	1498	78
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-8252	-13457	0	0	0	7804	2197	2945
FUEL SAVINGS CASES ONLY	14654	-8252	-13457	0	0	0	7804	2197	2945
COST SAVINGS CASES ONLY	175	-1097	-165	0	0	0	1498	78	489
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	175	-1097	-165	0	0	0	1498	78	489
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-8252	-13457	0	0	0	7804	2197	2945
FUEL SAVINGS CASES ONLY	14654	-8252	-13457	0	0	0	7804	2197	2945
COST SAVINGS CASES ONLY	175	-1097	-165	0	0	0	1498	78	489
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	175	-1097	-165	0	0	0	1498	78	489
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

Power Systems Division

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CIAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E				EMISSIONS SAVINGS				01	
NO. 7 ADVANCED TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT), COAL DER. B.G.										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT UTILITY		TONS PER YEAR		ECS SIZE (MW)	
INDUSTRY	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000													
NO.01 MEAT PACKING	0.036	3.7	48.0	-0.214	-83139	910650	0.206	-33064	51337	18273	4.62								
NO.02 BAKING	-0.081	-3.2	15.7	-0.633	-90366	630520	0.127	-13822	16786	2963	0.17*								
NO.03 MALT BEVERAGE	0.137	9.8	18.9	-0.018	-4697	387581	0.230	-7486	20256	12770	1.40								
NO.04 HOVEN FABRIC MILL	-0.300	-32.3	77.8	-0.668	-265021	1368188	0.032	-79972	83274	3303	2.07								
NO.05 SAW MILL	-0.216	-24.2	91.7	-0.960	-491052	4736771	0.125	-84127	98163	14036	0.21*								
NO.06 NEWSPRINT MILL	-0.079	-9.5	91.4	-0.187	-81328	408711	0.209	-72101	96292	24191	73.80								
NO.07 WRITING PAPER MILL	0.092	10.3	59.1	-0.002	-1083	463119	0.272	-42244	74301	32057	19.08								
NO.08 CORRUGATED PAPER	0.211	106.6	205.4	0.148	278517	1159201	0.332	-75944	218524	142560	47.72								
NO.09 BOX BOARD	0.180	27.9	72.5	0.108	62169	418686	0.325	-33206	76864	43659	40.27								
NO.10 CHLORINE	-0.051	-33.9	499.1	-0.173	-428049	2503425	0.223	-393420	540818	147399	47.86								
NO.11 ALUMINA	-0.082	-9.1	32.0	-0.138	-60888	262733	0.041	-30701	34273	3572	17.75								
NO.12 LOW DENS. POLYETHYL	-0.216	-37.6	148.6	-0.381	-243652	905225	0.136	-135001	159056	24055	19.48								
NO.13 HI DENS. POLYETHYL	-0.211	-16.1	53.7	-0.374	-105096	406602	0.090	-50932	57565	6633	9.97								
NO.14 POLYVINYL CHLORIDE	-0.197	-22.7	73.7	-0.375	-150383	679605	0.078	-70391	78782	8391	7.15								
NO.15 STYRENE-BUT. RUB.	0.020	0.4	4.2	-0.096	-6910	76630	0.096	-3076	4463	1387	1.55								
NO.16 NYLON	-0.250	-7.2	20.7	-0.468	-49928	216086	0.067	-20298	22168	1869	4.16								
NO.17 STYRENE	0.008	1.4	7.0	-0.067	-45396	200424	0.008	-6631	7532	901	3.55								
NO.19 ETHYLENE	0.027	31.5	16.2	-0.003	-13468	517530	0.007	-10805	16628	5023	2.93								
NO.19 PETROLEUM REFINING	0.030	122.5	293.3	-0.009	-129464	3060026	0.040	-193776	313958	120183	20.79								
NO.20 TIRES	-0.133	-14.5	55.8	-0.305	-123683	670740	0.083	-51641	59693	6051	7.44								
NO.23 INTEGRATED STEEL	-0.023	-102.5	487.4	-0.058	-619071	4740529	0.021	-418550	521814	103265	105.81								
NO.24 GRAY IRON FOUNDRY	-0.126	-19.5	74.2	-0.250	-139607	515210	0.072	-69568	79390	9822	18.43								
NO.25 COPPER	-0.144	-23.0	82.6	-0.311	-182933	892587	0.072	-78195	88446	10252	5.93								
NO.26 MOTOR VEHICLE	-0.100	-20.9	93.8	-0.201	-213042	994782	0.099	-84681	100465	15784	10.80								
TOTAL -- ALL	-62	2623	-3195560	27123520	-2059624	2820943	761219												
FUEL SAVINGS CASES ONLY	314	725	7193853	406231	783864	377632													
COST SAVINGS CASES ONLY	134	278	340656	1577837	-109150	295389	166238												
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0												
FUEL & COST SAVINGS CASES	134	278	340656	1577837	-109150	295389	166238												
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0												

YEAR : 1990
 NO. 7 ADVANCED TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL DLR. B.G. *** STRATEGY MATCH-E
 NATIONAL SUMMARY

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
ALL	23	9018			-8932344	79726480			-6961719	9794864
FUEL SAVINGS CASES ONLY	1202	2869			666540	26580960			-1641031	3221261
COST SAVINGS CASES ONLY	550	1136			1392389	6446849			-446096	1207254
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0
FUEL & COST SAVINGS CASES	550	1136			1392389	6446849			-446096	1207254
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	BOILER FUEL	COAL FUEL	OTHER SAVINGS
ALL	14654	-425	6032	0	0	-30289	7804	2197
FUEL SAVINGS CASES ONLY	11850	-17	4696	0	0	-20589	3865	1366
COST SAVINGS CASES ONLY	745	0	509	0	0	-2151	1446	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	745	0	509	0	0	-2151	1446	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

ALL	23	2197	23
FUEL SAVINGS CASES ONLY	1202	1366	1202
COST SAVINGS CASES ONLY	550	0	550
EMISSIONS SAVINGS CASE ONLY	0	0	0
FUEL & COST SAVINGS CASES	550	0	550
FUEL, COST & EMISSION SAVING	0	0	0

INCLUDING COAL FUEL CONVERSION

ALL	-4253
FUEL SAVINGS CASES ONLY	-524
COST SAVINGS CASES ONLY	166
EMISSIONS SAVINGS CASE ONLY	0
FUEL & COST SAVINGS CASES	166
FUEL, COST & EMISSION SAVING	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E				EMISSIONS SAVINGS		ECS	
NO. & ADVANCED TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT), COAL(AFB)										CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	TOTAL UTILITY	SAVINGS PLANT TOTAL	TOTAL SAVINGS PLANT TOTAL	TOTAL SAVINGS PLANT TOTAL	TOTAL SAVINGS PLANT TOTAL
INDUSTRY	FUEL ENERGY SAVINGS RATIO	FUEL ENERGY TOTAL SAVINGS	UTILITY SAVINGS	COST SAVINGS DOLLARS \$000	COST SAVINGS RATIO	UTILITY SAVINGS RATIO	UTILITY SAVINGS RATIO	UTILITY SAVINGS RATIO	UTILITY SAVINGS RATIO								
NO.01 HEAT PACKING	-0.021	-2.2	49.0	-0.097	-37578	1607830	0.127	-40107	51337	11230	4.74						
NO.02 BAKING	-0.165	-6.6	15.7	-0.613	-87485	907609	-0.913	-17093	16786	-307	0.18*						
NO.03 MALT BEVERAGE	0.102	7.3	18.9	0.134	35322	742244	0.173	-10667	20256	9589	1.45						
NO.04 WOVEN FABRIC MILL	-0.489	-52.7	77.8	-0.562	-222705	2342737	-0.148	-98464	83274	-15189	2.12						
NO.05 SAW MILL	-0.445	-49.9	91.7	-1.312	-671085	7616811	-0.081	-107245	93163	-9082	0.22*						
NO.06 NEWSPRINT MILL	-0.053	-6.4	91.4	0.181	78844	608853	0.200	-73005	96292	23286	74.66						
NO.07 WRITING PAPER MILL	0.096	10.7	59.1	0.265	129810	759228	0.248	-45033	74301	29268	19.39						
NO.08 CORRUGATED PAPER	0.190	96.2	205.4	0.385	722172	1861350	0.292	-93240	218524	125284	48.61						
NO.09 BOX BOARD	0.229	35.5	72.5	0.386	222125	657939	0.340	-31098	76864	45767	40.92						
NO.10 CHLORINE	-0.030	-20.0	499.1	0.184	455868	3674297	0.212	-400681	540818	140137	48.34						
NO.11 ALUMINA	-0.111	-12.3	32.0	0.053	23626	444675	-0.010	-35170	34273	-897	18.31						
NO.12 LOW DENS. POLYETHYL	-0.219	-39.3	149.6	-0.015	-9468	1427573	0.102	-140905	159056	18151	19.72						
NO.13 HI DENS. POLYETHYL	-0.290	-21.4	53.7	-0.060	-16788	674090	0.008	-56983	57565	592	10.16						
NO.14 POLYVINYL CHLORIDE	-0.296	-34.1	73.7	-0.091	-38303	1122551	-0.028	-81769	78782	-2987	7.30						
NO.15 STYRENE-BUT. RUB.	-0.022	-0.4	4.2	0.089	6408	138103	0.039	-3912	4463	552	1.60						
NO.16 NYLON	-0.402	-11.6	20.7	-0.241	-25717	368300	-0.081	-24444	22168	-2277	4.26						
NO.17 STYRENE	0.004	0.8	7.0	0.251	170645	310841	-0.031	-7595	7532	-64	3.54						
NO.18 ETHYLENE	0.008	9.8	16.2	0.380	1541897	1231840	-0.013	-26912	16628	-10284	2.63						
NO.19 PETROLEUM REFINING	-0.004	-16.1	293.3	0.363	5347536	5262308	0.003	-305535	313958	8424	20.36						
NO.20 TIRES	-0.198	-21.7	55.8	-0.028	-11451	1108044	0.005	-59217	59693	476	7.59						
NO.23 INTEGRATED STEEL	-0.019	-86.3	487.4	0.007	74833	5828225	0.020	-422594	521814	99220	106.83						
NO.24 GRAY IRON FOUNDRY	-0.145	-22.4	74.2	0.125	69441	845930	0.037	-74391	79390	4999	18.65						
NO.25 COPPER	-0.228	-36.6	82.6	-0.029	-16927	1482005	-0.023	-91674	88446	-3228	6.06						
NO.26 MOTOR VEHICLE	-0.133	-27.8	93.8	-0.017	-12716	1604659	0.044	-93421	100465	7044	10.99						
TOTAL -- ALL		-307	2623		7728302	42627968		-2341149	2820843	479695							
FUEL SAVINGS CASES ONLY		160	379		2021971	5563471		-214546	414105	199559							
COST SAVINGS CASES ONLY		-4	1861		8875526	22365840		-1529832	2005111	475281							
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0							
FUEL & COST SAVINGS CASES		160	379		2821971	5563471		-214546	414105	199559							
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0							

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 8 ADVANCED TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT), COAL(AFB)

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS			UTILITY		CAPITAL COST \$000	EMISSIONS SAVINGS		
	10**12 BTU	10**12 BTU	10**12 BTU	SAVINGS	FUEL		PLANT	UTILITY	TOTAL
TOTAL -- ALL	-610	9016				28396080	-7792727	9794866	2002137
FUEL SAVINGS CASES ONLY	787	2194				17825680	-1422984	2499290	1076310
COST SAVINGS CASES ONLY	278	6667				30825632	-5330966	7277880	1946916
EMISSIONS SAVINGS CASE ONLY	0	0				0	0	0	0
FUEL & COST SAVINGS CASES	787	2194				17825680	-1422984	2499290	1076310
FUEL, COST & EMISSION SAVING	0	0				0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS			COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	OTHER	
TOTAL -- ALL	14654	-425	6082	0	-23119	2197
FUEL SAVINGS CASES ONLY	7987	0	2883	0	-10125	41
COST SAVINGS CASES ONLY	14058	-425	5878	0	-21326	2092
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7987	0	2883	0	-10125	41
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-23119	2197	-610
FUEL SAVINGS CASES ONLY	7987	0	2883	0	-10125	41	787
COST SAVINGS CASES ONLY	14058	-425	5878	0	-21326	2092	278
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7987	0	2883	0	-10125	41	787
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	-23119	2197	-610
FUEL SAVINGS CASES ONLY	7987	0	2883	0	-10125	41	787
COST SAVINGS CASES ONLY	14058	-425	5878	0	-21326	2092	278
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7987	0	2883	0	-10125	41	787
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO. 9 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL DER. DIST.												
INDUSTRY	FUEL ENERGY TOTAL		UTILITY FUEL		COST		SAVINGS		ECS SIZE (MM)			
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	FUEL SAVINGS	RATIO	COST	DOLLARS \$000	SAVINGS \$000				
*** STRATEGY MATCH-E												
		CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		SAVINGS PLANT		EMISSIONS SAVINGS TONS PER YEAR				
								TOTAL				
NO.01 MEAT PACKING	0.260	27.3	48.0	-0.040	-15427	564773	0.172	-36125	51337	15212	4.30	
NO.02 BAKING	0.223	8.9	15.7	-0.024	-11942	127469	0.222	-11626	16786	5160	0.16*	
NO.03 MALT BEVERAGE	0.153	10.9	18.9	-0.003	-2155	187302	0.102	-14607	20256	5649	1.31	
NO.04 WOVEN FABRIC MILL	0.410	44.2	77.8	0.030	12065	535160	0.254	-57223	83275	26052	1.90	
NO.05 SAW MILL	0.423	47.5	91.7	-0.007	-3563	1499446	0.245	-70607	98163	27556	0.20*	
NO.06 NEWSPRINT MILL	0.429	51.5	91.4	0.056	24354	523604	0.258	-68335	96292	29956	13.80*	
NO.07 WRITING PAPER MILL	0.295	32.9	59.1	0.032	15529	474975	0.189	-52013	74301	22288	11.99*	
NO.08 CORRUGATED PAPER	0.223	113.0	205.4	0.016	29598	1527667	0.145	-156399	218524	62125	13.00*	
NO.09 BOX BOARD	0.256	39.7	72.5	0.020	11575	525338	0.165	-54710	76864	22146	12.15*	
NO.10 CHLORINE	0.476	318.4	499.1	0.108	269200	2864160	0.296	-345357	540918	195462	14.88*	
NO.11 ALUMINA	0.090	10.0	32.0	-0.053	-23651	230651	0.047	-30123	34273	4150	10.95*	
NO.12 LOW DENS. POLYETHYL	0.397	69.2	148.6	-0.022	-14335	830318	0.220	-120069	159056	38987	12.09*	
NO.13 HI DENS. POLYETHYL	0.399	30.5	53.7	0.051	14442	311634	0.243	-39694	57565	17871	9.24*	
NO.14 POLYVINYL CHLORIDE	0.364	41.9	73.7	0.044	18778	440954	0.225	-54502	78782	24279	6.62	
NO.15 STYRENE-EMUL. RUB.	0.133	2.5	4.2	0.101	69	37890	0.092	-3273	4463	1190	1.45	
NO.16 NYLON	0.406	11.7	20.7	0.061	6475	113817	0.248	-15229	22168	6939	3.84	
NO.17 STYRENE	0.009	1.7	7.0	-0.074	-49996	175547	-0.016	-9364	7532	-1832	3.38	
NO.18 ETHYLENE	0.010	11.7	16.2	-0.045	-182659	973444	-0.026	-37237	16628	-20609	4.78	
NO.19 PETROLEUM REFINING	0.055	226.2	293.3	-0.023	-345213	4591717	0.019	-258406	313958	55553	14.35*	
NO.20 TIRES	0.291	31.8	55.8	0.011	4635	459420	0.187	-41485	59693	18208	6.90	
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00*	
NO.24 GRAY IRON FOUNDRY	0.335	51.9	74.2	0.073	40528	476099	0.222	-49280	79390	30111	11.47*	
NO.25 COPPER	0.294	47.1	82.6	0.024	14037	558711	0.185	-62071	88446	26376	5.50	
NO.26 MOTOR VEHICLE	0.256	53.5	93.8	-0.035	-26638	798488	0.190	-70083	100465	30392	10.04*	
TOTAL -- ALL										2850343		5507789
FUEL SAVINGS CASES ONLY										-1655819		643210
COST SAVINGS CASES ONLY										-997578		493002
EMISSIONS SAVINGS CASE ONLY										4342768		4864582
FUEL & COST SAVINGS CASES										-997578		1480577
FUEL, COST & EMISSIONS SAVING										0		0

YEAR : 1990
 NO. 9 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL DER. DIST.
 - COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY

07

*** STRATEGY MATCH-E

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 DTU			COST SAVINGS DOLLARS \$000		CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR		
	10**12 BTU	UTILITY FUEL	SAVINGS	10**12 BTU	10**12 DTU		PLANT	UTILITY	TOTAL
TOTAL -- ALL	4609	9018		-926799	67243056	1873202	9794864		11668062
FUEL SAVINGS CASES ONLY	4609	8084		-926799	67243056	-6451056	8794646		2343580
COST SAVINGS CASES ONLY	3350	5790		1689110	35020368	-4347506	6344470		1996964
EMISSIONS SAVINGS CASE ONLY	0	934		0	0	8324262	1000218		9324481
FUEL & COST SAVINGS CASES	3350	5790		1689110	35020368	-4347506	6344470		1996964
FUEL, COST & EMISSION SAVING	0	0		0	0	0	0		0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU			COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	FUEL	COAL	DISTILLATE FUEL	
TOTAL -- ALL	14654	-425	6082	0	-5843	15579
FUEL SAVINGS CASES ONLY	13108	-425	5508	0	-5843	9581
COST SAVINGS CASES ONLY	1759	-17	1209	0	-4086	6739
EMISSIONS SAVINGS CASE ONLY	1466	0	574	0	0	5998
FUEL & COST SAVINGS CASES	1758	-17	1209	0	-4086	6739
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	1466	0	574	0	0	6269	2197	1816	4609
FUEL SAVINGS CASES ONLY	0	0	0	0	0	271	1545	1816	4609
COST SAVINGS CASES ONLY	0	0	0	0	0	1713	129	1843	3350
EMISSIONS SAVINGS CASE ONLY	1466	0	574	0	0	5998	651	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	1713	129	1843	3350
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	1466	0	574	0	0	6269	2197	1816	4609
FUEL SAVINGS CASES ONLY	0	0	0	0	0	271	1545	1816	4609
COST SAVINGS CASES ONLY	0	0	0	0	0	1713	129	1843	3350
EMISSIONS SAVINGS CASE ONLY	1466	0	574	0	0	5998	651	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	1713	129	1843	3350
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

Power Systems Division

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INDUSTRY	NO. 10 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL DERIVED BOILER GRD				*** STRATEGY MATCH-E				EMISSIONS SAVINGS				ECS SIZE (MM)
	FUEL SAVINGS RATIO	ENERGY TOTAL	COAL UTILITY	DERIVED COST	SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	SAVINGS TOTAL	----		
NO. 01 MEAT PACKING	0.239	25.0	48.0	-0.055	-21373	1065256	-0.357	-83011	51337	-31674	4.30*		
NO. 02 BAKING	0.170	6.8	15.7	-0.187	-26769	369405	-0.481	-27995	16786	-11209	0.16*		
NO. 03 MALT BEVERAGE	0.109	7.8	18.9	-0.041	-10889	367680	-0.262	-34807	20256	-14551	1.32*		
NO. 04 WOVEN FABRIC MILL	0.189	20.4	77.8	-0.164	-65059	1275505	-0.639	-148756	83274	-65481	1.93*		
NO. 05 SAW MILL	0.315	35.4	91.7	-0.206	-105373	3065711	-0.600	-165768	98163	-67605	0.20*		
NO. 06 NEWSPRINT MILL	0.320	38.5	91.4	0.104	45360	826824	-0.554	-160883	96292	-64391	27.73		
NO. 07 WRITING PAPER MILL	0.242	26.9	59.1	0.078	38157	751070	-0.408	-122441	74301	-48140	18.02		
NO. 08 CORRUGATED PAPER	0.204	103.4	205.4	0.078	146673	2240015	-0.318	-354837	218524	-136313	22.74		
NO. 09 BOX BOARD	0.234	36.3	72.5	0.095	54485	758903	-0.354	-124539	76864	-47674	25.50		
NO. 10 CHLORINE	0.093	195.7	499.1	0.066	163920	4852021	-0.569	-916867	540318	-376049	22.50		
NO. 11 ALUMINA	0.041	4.6	32.0	-0.053	-23315	374111	-0.341	-64061	34273	-29787	16.52		
NO. 12 LOW DENS. POLYETHYL	0.210	36.7	148.6	-0.057	-36315	1481600	-0.714	-285524	159056	-126467	18.32		
NO. 13 HI DENS. POLYETHYL	0.193	14.8	53.7	-0.047	-13209	595031	-0.611	-102458	57565	-44893	9.35		
NO. 14 POLYVINYL CHLORIDE	0.192	22.2	73.7	-0.040	-16718	873690	-0.558	-138992	76782	-60210	6.69*		
NO. 15 STYRENE-BUT. RUB.	0.097	1.8	4.2	-0.017	-1246	71572	-0.224	-7711	4463	-3247	1.46*		
NO. 16 NYLON	0.214	6.2	20.7	-0.041	-4352	243719	-0.601	-39002	22168	-16834	3.88*		
NO. 17 STYRENE	0.009	1.4	7.0	-0.071	-47945	220034	-0.078	-16219	7532	-8687	3.39*		
NO. 18 ETHYLENE	0.023	26.5	16.2	-0.015	-60094	746159	-0.034	-43894	16628	-27266	3.42*		
NO. 19 PETROLEUM REFINING	0.056	226.3	293.3	0.003	37727	4567571	-0.076	-542121	313958	-228162	20.16		
NO. 20 TIRES	0.190	20.7	55.8	-0.038	-15323	859738	-0.438	-102381	59693	-42689	6.95*		
NO. 23 INTEGRATED STEEL	0.027	123.7	487.4	-0.011	-120887	7830640	-0.063	-827945	521814	-306130	24.94		
NO. 24 GRAY IRON FOUNDRY	0.178	27.6	74.2	-0.004	-2070	829429	-0.430	-137649	79390	-58259	17.30		
NO. 25 COPPER	0.190	30.4	82.6	-0.015	-8844	1073636	-0.451	-152658	88446	-64211	5.54*		
NO. 26 MOTOR VEHICLE	0.163	34.0	93.8	-0.076	-57710	1414636	-0.454	-173281	100465	-72815	18.11		
TOTAL -- ALL		1075	2623		-151970	37053872		-4773588	2828843	-1952743			
FUEL SAVINGS CASES ONLY		1075	2623		-151970	37053872		-4773588	2828843	-1952743			
COST SAVINGS CASES ONLY		609	1221		406322	14296409		-2221495	1320757	-900730			
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0			
FUEL & COST SAVINGS CASES		629	1221		486322	14296409		-2221466	1320757	-900730			
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0			

YEAR : 1990
 NO.10 ADVANCED TECHNOLOGY,DIESEL,LOW SPEED,COAL DERIVED BOILER GRD
 NATIONAL SUMMARY
 *** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
TOTAL -- ALL	3708	9018	9018	9018	456446	456446	117025744	117025744	-16687789	9794864	-6892917	-6892917
FUEL SAVINGS CASES ONLY	3708	9018	9018	9018	456446	456446	117025744	117025744	-16687789	9794864	-6892917	-6892917
COST SAVINGS CASES ONLY	2421	5057	5057	5057	2504207	2504207	55948688	55948688	-9268029	5560607	-3707419	-3707419
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	2421	5057	5057	5057	2504207	2504207	55948688	55948688	-9268029	5560607	-3707419	-3707419
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS		DISTILLATE FUEL		PETROLEUM		BOILER FUEL		COAL		OTHER FUEL		TOTAL FUEL	
TOTAL -- ALL	14654	-425	-425	6032	0	0	-26604	7804	2197	3708	2197	3708	2197	3708
FUEL SAVINGS CASES ONLY	14654	-425	-425	6032	0	0	-26604	7804	2197	3708	2197	3708	2197	3708
COST SAVINGS CASES ONLY	5027	0	0	2870	0	0	-13059	6274	1309	2421	1309	2421	1309	2421
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	5027	0	0	2870	0	0	-13059	6274	1309	2421	1309	2421	1309	2421
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION:

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS		TOTAL	
TOTAL -- ALL	0	0	0	0	0	0	0	0	-1186	2197	1011	1011
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	-1186	2197	1011	1011
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	-1101	1309	209	209
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	-1101	1309	209	209
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL															01
INDUSTRY	NO.11 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL(PULVERIZED)				SAVINGS DOLLARS \$000	*** STRATEGY MATCH-E			EMISSIONS SAVINGS			ECS SIZE (MM)			
	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS RATIO	COST RATIO		CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT TOTAL	EMISSIONS SAVINGS RATIO	PLANT TOTAL					
NO.01 MEAT PACKING	0.236	24.8	48.0	0.052	20360	1270634	-0.405	-87242	51337	-35905	4.30*				
NO.02 BAKING	0.134	5.4	15.7	-0.124	-17752	433534	-0.587	-30455	16786	-13669	0.16*				
NO.03 MALT BEVERAGE	0.084	6.0	18.9	0.002	639	439927	-0.315	-37779	20256	-17523	1.32*				
NO.04 KOVEN FABRIC MILL	0.177	19.1	77.8	0.018	7096	1541983	-0.712	-156308	83274	-73034	1.92*				
NO.05 SAW MILL	0.295	33.1	91.7	-0.067	-34103	3477824	-0.689	-175660	98163	-77497	0.20*				
NO.06 NEWSPRINT MILL	0.249	29.9	91.4	0.290	126437	901866	-0.676	-174868	96292	-78576	27.81				
NO.07 WRITING PAPER MILL	0.193	21.4	59.1	0.197	96513	848330	-0.501	-133348	74301	-59067	18.07				
NO.08 CORRUGATED PAPER	0.194	98.1	205.4	0.202	378531	2414706	-0.367	-375945	218524	-157421	22.73				
NO.09 BOX BOARD	0.214	33.1	72.5	0.227	130591	826737	-0.417	-133025	78864	-56160	25.51				
NO.10 CHLORINE	0.268	179.2	499.1	0.294	729801	5306809	-0.655	-973663	540818	-432844	22.53				
NO.11 ALUMINA	0.015	1.6	32.0	0.007	3022	422764	-0.398	-69061	36273	-34787	16.57				
NO.12 LOW DENS. POLYETHYL	0.196	34.2	148.6	0.212	135385	1656150	-0.795	-299956	159056	-140900	18.30				
NO.13 HI DENS. POLYETHYL	0.182	13.9	53.7	0.165	46266	684128	-0.682	-107679	57565	-50114	9.34				
NO.14 POLYVINYL CHLORIDE	0.182	20.9	73.7	0.147	62227	1019312	-0.624	-146132	78782	-67351	6.68*				
NO.15 STYRENE-BUT. RUB.	0.077	1.5	4.2	0.021	1511	84566	-0.269	-8368	4463	-3905	1.47*				
NO.16 NYLON	0.203	5.9	20.7	0.160	17103	292137	-0.673	-41010	22168	-18843	3.88*				
NO.17 STYRENE	0.007	1.4	7.0	-0.060	-40726	238517	-0.093	-16954	7532	-9322	3.38*				
NO.18 ETHYLENE	0.022	26.2	16.2	-0.009	-37753	790715	-0.037	-45981	16628	-29354	3.42*				
NO.19 PETROLEUM REFINING	0.055	224.7	293.3	0.027	394169	5291375	-0.096	-571094	313956	-257136	20.13				
NO.20 TILES	0.152	16.6	55.8	0.070	28197	1012054	-0.520	-110361	59593	-50669	6.96*				
NO.23 INTEGRATED STEEL	0.026	115.7	487.4	0.036	399029	7986064	-0.071	-867266	521814	-345452	28.47				
NO.24 GRAY IRON FOUNDRY	0.167	25.8	74.2	0.142	79456	941043	-0.488	-145529	79390	-66139	17.33				
NO.25 COPPER	0.153	24.5	82.6	0.101	59182	1277649	-0.532	-164242	88446	-75796	5.55*				
NO.26 MOTOR VEHICLE	0.133	27.8	93.8	0.029	22273	1635722	-0.534	-186091	100465	-85616	18.13				
TOTAL -- ALL					2597346	40793940		-5057901	2820843	-2237050					
FUEL SAVINGS CASES ONLY					2597346	40793940		-5057901	2820843	-2237050					
COST SAVINGS CASES ONLY					925	35853296		-4738952	2681737	-2107210					
EMISSIONS SAVINGS CASE ONLY					0	0		0	0	0					
FUEL & COST SAVINGS CASES					925	35853296		-4738952	2681737	-2107210					
FUEL,COST & EMISSION SAVING					0	0		0	0	0					

YEAR : 1990
 NO. 11 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL (FUELVERIFIED)
 NATIONAL SUMMARY

07

*** STRATEGY MATCH-E

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	\$000	\$000	\$000	PLANT	UTILITY
TOTAL -- ALL	3296	9010			9746931	129192336			-17784948	9794864
FUEL SAVINGS CASES ONLY	3296	9010			9746931	129192336			-17784948	9794864
COST SAVINGS CASES ONLY	3024	8668			10268422	115023690			-16991280	9425359
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0
FUEL & COST SAVINGS CASES	3024	8668			10268422	115023690			-16991280	9425359
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	COAL	DISTILLATE	BOILER FUEL	OTHER
TOTAL -- ALL	14654	-425	0	0	-19261	49
FUEL SAVINGS CASES ONLY	14654	-425	0	0	-19261	49
COST SAVINGS CASES ONLY	7672	-425	0	0	-10416	-14
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7672	-425	0	0	-10416	-14
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	1466	0	574	0	0	-1364	2197	2072
FUEL SAVINGS CASES ONLY	1466	0	574	0	0	-1364	2197	2072
COST SAVINGS CASES ONLY	1466	0	574	0	0	-1645	2140	2535
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1466	0	574	0	0	-1645	2140	2535
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	1466	0	574	0	0	-1364	2197	2072
FUEL SAVINGS CASES ONLY	1466	0	574	0	0	-1364	2197	2072
COST SAVINGS CASES ONLY	1466	0	574	0	0	-1645	2140	2535
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1466	0	574	0	0	-1645	2140	2535
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CYAS GENERAL SUMMARY - PROCESS LEVEL									
NO.12 ADVANCED TECHNOLOGY GAS TURBINE, DIELECT FIPED, PETR. BOILER GRD									
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST DOLLARS \$000	STRATEGY MATCH-E		EMISSIONS SAVINGS		ECS SIZE (TPI)
					CAPITAL COST \$000	SAVINGS RATIO	PLANT UTILITY	SAVINGS TOTAL	
NO.01 MEAT PACKING	0.273	20.7	48.0	0.150	58247	0.440	-14034	51337	37303 4.26*
NO.02 DRYING	0.177	7.1	15.7	-0.071	-10160	0.484	-5847	16786	10939 0.16*
NO.03 MALT BEVERAGE	0.174	12.3	18.9	0.098	25768	0.287	-5325	20256	14931 1.29*
NO.04 WOVEN FABRIC MILL	0.187	20.1	77.8	0.028	10999	0.446	-38410	63274	44864 1.91
NO.05 SAW MILL	0.079	8.0	91.7	-0.207	-105699	0.390	-54813	98163	43350 0.20*
NO.06 NEWSPRINT MILL	0.269	32.3	91.4	0.172	74923	0.504	-39708	96292	57584 68.75
NO.07 KNITTING PAPER MILL	0.304	33.8	59.1	0.217	106466	0.475	-20474	74301	53827 17.90
NO.08 CORRUGATED PAPER	0.236	119.2	205.4	0.173	304985	0.384	-62113	219524	156411 44.85
NO.09 BOX BOARD	0.271	41.9	72.5	0.201	115429	0.430	-21571	76264	55293 37.72
NO.10 CHLORINE	0.354	236.5	499.1	0.254	630488	0.558	-178728	540819	362090 44.64
NO.11 ALUMINA	0.099	11.0	32.0	0.050	21963	0.229	-14869	34273	19405 16.19
NO.12 LOW DENS. POLYETHYL	0.175	30.6	148.6	0.058	37120	0.462	-77959	159056	81097 18.17
NO.13 HI DENS. POLYETHYL	0.323	24.7	53.7	0.219	61435	0.528	-19613	57565	37952 9.23
NO.14 POLYVINYL CHLORIDE	0.370	42.6	73.7	0.268	113227	0.548	-21341	78792	57440 8.59
NO.15 STYRENE-BUT. RUB.	0.151	2.9	4.2	0.087	6324	0.217	-1216	4463	3248 1.41*
NO.16 NYLON	0.279	8.1	20.7	0.165	17629	0.501	-8435	22168	13733 3.84
NO.17 STYRENE	0.012	2.2	7.0	-0.053	-39622	0.019	-5563	7532	1969 3.35*
NO.18 ETHYLENE	0.011	13.4	16.2	-0.035	-140589	-0.007	-21389	16628	-4761 4.74*
NO.19 PETROLEUM REFINING	0.048	278.7	293.3	0.020	299280	0.087	-77699	313958	236259 21.15
NO.20 TILES	0.299	32.7	55.8	0.196	79318	0.465	-16173	59693	43520 6.87
NO.23 INTEGRATED STEEL	0.053	241.4	437.4	0.065	694435	0.076	-154291	521814	367524 98.42
NO.24 GRAY IRON FOUNDRY	0.213	33.0	74.2	0.125	69530	0.358	-28949	79390	50441 17.23
NO.25 COPPER	0.302	43.4	92.6	0.203	119060	0.467	-24476	85446	63970 5.47
NO.26 MOTOR VEHICLE	0.263	54.9	93.8	0.139	105641	0.474	-27431	100465	73034 9.99
TOTAL -- ALL		1365	2623		2676171		-939426	2820544	1881420
FUEL SAVINGS CASES ONLY		1365	2623		2676171		-939426	2820544	1881420
COST SAVINGS CASES ONLY		1334	2492		2972243		-851815	2681737	1829924
EMISSIONS SAVINGS CASE ONLY		0	0		0		0	0	0
FUEL & COST SAVINGS CASES		1334	2492		2972243		-951815	2681737	1829924
FUEL, COST & EMISSIONS SAVING		0	0		0		0	0	0

07

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.12 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,PETR. BOILER GRD

*** STRATEGY MATCH-E

CATEGORY	TOTAL FUEL SAVINGS		TOTAL UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	PLANT	TONS PER YEAR	TOTAL
TOTAL -- ALL	4402	9010			6717625		49683744	-3442422	9794866	6352434
FUEL SAVINGS CASES ONLY	4402	9010			6717625		49683744	-3442422	9794866	6352434
COST SAVINGS CASES ONLY	4264	8668			10116045		30135576	-3148826	9425361	6276524
EMISSIONS SAVINGS CASE ONLY	0	0			0		0	0	0	0
FUEL & COST SAVINGS CASES	4264	8668			10116045		30135576	-3148826	9425361	6276524
FUEL,COST & EMISSION SAVING	0	0			0		0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		TOTAL FUEL	
	NATURAL PETROLEUM	PETROLEUM	GAS	COAL	OTHER	FUEL
TOTAL -- ALL	14654	-425	-19828	0	0	7804
FUEL SAVINGS CASES ONLY	14654	-425	-19828	0	0	7804
COST SAVINGS CASES ONLY	7672	-425	-12520	0	0	7398
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7672	-425	-12520	0	0	7398
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	-19828	0	0	7804	2197	4402
FUEL SAVINGS CASES ONLY	14654	-425	-19828	0	0	7804	2197	4402
COST SAVINGS CASES ONLY	7672	-425	-12520	0	0	7398	2140	4264
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7672	-425	-12520	0	0	7398	2140	4264
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	-19828	0	0	7804	2197	4402
FUEL SAVINGS CASES ONLY	14654	-425	-19828	0	0	7804	2197	4402
COST SAVINGS CASES ONLY	7672	-425	-12520	0	0	7398	2140	4264
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7672	-425	-12520	0	0	7398	2140	4264
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E				EMISSIONS SAVINGS				01	
NO.13 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL DER. BLR GRD										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT UTILITY		TONS PER YEAR		ECS SIZE (MM)	
INDUSTRY										FUEL ENERGY TOTAL FUEL SAVINGS RATIO		FUEL UTILITY FUEL SAVINGS RATIO		FUEL COST \$000		FUEL SAVINGS DOLLARS \$000		TOTAL	
NO.01 MEAT PACKING	0.273	28.7	48.0	0.151	58509					365600	0.411	-14928	51337	36409	4.26*				
NO.02 BAKING	0.177	7.1	15.7	-0.071	-10099					197039	0.449	-6339	16786	10446	0.16*				
NO.03 MALT BEVERAGE	0.174	12.3	18.9	0.098	25831					157250	0.265	-5532	20256	14725	1.29*				
NO.04 WOVEN FABRIC MILL	0.187	20.1	77.8	0.029	11371					422702	0.403	-41964	83275	41311	1.91				
NO.05 SAW MILL	0.079	8.8	91.7	-0.206	-105307					2006951	0.338	-60058	98163	38'05	0.20*				
NO.06 NEWSPRINT MILL	0.269	32.3	91.4	0.173	75407					208485	0.465	-42282	96292	54010	68.75				
NO.07 WRITING PAPER MILL	0.304	33.8	59.1	0.218	106741					21358	0.443	2214	74301	52161	17.90				
NO.08 CORRUGATED PAPER	0.236	119.2	205.4	0.174	325785					839647	0.355	-66222	218524	152301	44.85				
NO.09 BOX BOARD	0.271	41.9	72.5	0.201	115710					284393	0.401	-22985	76864	53880	37.72				
NO.10 CHLORINE	0.354	236.5	499.1	0.255	632501					1134871	0.523	-194848	540810	345970	44.64				
NO.11 ALUMINA	0.099	11.0	32.0	0.050	22094					127532	0.208	-16103	34273	18171	16.19				
NO.12 LOW DENS. POLYETHYL	0.175	30.6	148.6	0.059	37714					355284	0.415	-85452	159056	73604	18.17				
NO.13 HI DENS. POLYETHYL	0.323	24.7	53.7	0.220	61649					154913	0.493	-21346	57565	36219	9.23				
NO.14 POLYVINYL CHLORIDE	0.370	42.6	73.7	0.268	113519					247587	0.516	-23086	78782	55696	6.59				
NO.15 STYRENE-BUT. RUB.	0.151	2.9	4.2	0.088	6336					30561	0.220	-1267	4463	3196	1.41*				
NO.16 NYLON	0.279	8.1	20.7	0.166	17707					70314	0.463	-9193	22168	12974	3.84				
NO.17 STYRENE	0.012	2.2	7.0	-0.058	-39593					160273	0.013	-6048	7552	1484	3.35*				
NO.18 ETHYLENE	0.011	13.4	16.2	-0.035	-140469					914013	-0.008	-23180	16628	-6552	4.74*				
NO.19 PETROLEUM REFINING	0.070	285.4	293.3	0.022	325179					3438409	0.080	-74687	313958	239271	21.14				
NO.20 TILES	0.299	32.7	55.8	0.197	79604					293839	0.433	-17477	59693	42215	6.87				
NO.23 INTEGRATED STEEL	0.053	241.4	487.4	0.065	697560					3476268	0.072	-169601	521814	352213	98.42				
NO.24 GRAY IRON FOUNDRY	0.213	33.0	74.2	0.125	69363					224217	0.353	-31548	79390	47842	17.23				
NO.25 COPPER	0.302	48.4	62.6	0.203	119406					369040	0.435	-26465	88446	61981	5.47				
NO.26 MOTOR VEHICLE	0.263	54.9	93.8	0.140	106146					455635	0.442	-29653	100465	70812	9.99				
TOTAL -- ALL		1372	2623		2713241					16222470		-1012404	2820843	1808443					
FUEL SAVINGS CASES ONLY		1372	2623		2713241					16222470		-1012404	2820843	1808443					
COST SAVINGS CASES ONLY		1341	2492		3008710					12944195		-916778	2681737	1764960					
EMISSIONS SAVINGS CASE ONLY		0	0		0					0		0	0	0					
FUEL & COST SAVINGS CASES		1341	2492		3008710					12944195		-916778	2681737	1764960					
FUEL, COST & EMISSIONS SAVING		0	0		0					0		0	0	0					

YEAR : 1990
 NO.13 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL DER. BLR GRD
 NATIONAL SUMMARY
 *** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSION'S SAVINGS TONS PER YEAR		TOTAL	
TOTAL -- ALL	4414	9018	4414	9018	8806946	49266064	-3723540	9794866	6071311	6071311		
FUEL SAVINGS CASES ONLY	4414	9018	4414	9018	8806946	49266064	-3723540	9794866	6071311	6071311		
COST SAVINGS CASES ONLY	4277	8668	4277	8668	10203511	37737328	-3404029	9425361	6021318	6021318		
EMISSION'S SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0		
FUEL & COST SAVINGS CASES	4277	8668	4277	8668	10203511	37737328	-3404029	9425361	6021318	6021318		
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0		

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS NATURAL GAS		PETROLEUM DISTILLATE		BOILER FUEL		DISTILLATE BOILER FUEL		COAL DERIVED		TOTAL FUEL	
TOTAL -- ALL	14654	-425	6082	0	0	0	-25397	7804	2197	4414		
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	0	-25397	7804	2197	4414		
COST SAVINGS CASES ONLY	7672	-425	4067	0	0	0	-16575	7398	2140	4277		
EMISSION'S SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0		
FUEL & COST SAVINGS CASES	7672	-425	4067	0	0	0	-16575	7398	2140	4277		
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0		

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	0	-25397	7804	2197	4414		
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	0	-25397	7804	2197	4414		
COST SAVINGS CASES ONLY	7672	-425	4067	0	0	0	-16575	7398	2140	4277		
EMISSION'S SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0		
FUEL & COST SAVINGS CASES	7672	-425	4067	0	0	0	-16575	7398	2140	4277		
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0		

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	0	0	-177	2197	2020		
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	-177	2197	2020		
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	-118	2140	2022		
EMISSION'S SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0		
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	-118	2140	2022		
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0		

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO.14 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL GASIFIER												
INDUSTRY	FUEL ENERGY		UTILITY		COST SAVINGS		*** STRATEGY MATCH-E		EMISSIONS		01	
	SAVINGS	RATIO	SAVINGS	RATIO	DOLLARS	\$000	CAPITAL	SAVINGS	SAVINGS	PLANT	TONS PER YEAR	EMISSIONS

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.14 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL GASIFIER

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		
	10**12 BTU	10**12 BTU	SAVINGS	FUEL	SAVINGS	DOLLARS \$000	SAVINGS	DOLLARS \$000	PLANT	UTILITY	TOTAL
TOTAL -- ALL	752	9018				6173944	157104016		-5647393	9794866	4147460
FUEL SAVINGS CASES ONLY	1904	3071				7361543	73546432		-1354021	4079735	2725717
COST SAVINGS CASES ONLY	1464	6376				9829118	97543776		-3278372	6971336	3692959
EMISSIONS SAVINGS CASE ONLY	0	0				0	0		0	0	0
FUEL & COST SAVINGS CASES	1797	3526				8241675	62939120		-1183391	3930555	2747176
FUEL,COST & EMISSION SAVING	0	0				0	0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	COIL	BOILER	COAL	OTHER
ALL	14654	-425	6082	-15526	-6231	2197
FUEL SAVINGS CASES ONLY	12567	-425	5160	-15431	-1360	1392
COST SAVINGS CASES ONLY	5987	-425	3419	-6794	-2105	1381
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	5599	-425	3159	-6794	-1103	1361
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	COIL	BOILER	COAL	OTHER
ALL	14654	-425	6082	-15526	-6231	2197
FUEL SAVINGS CASES ONLY	12567	-425	5160	-15431	-1360	1392
COST SAVINGS CASES ONLY	5987	-425	3419	-6794	-2105	1381
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	5599	-425	3159	-6794	-1103	1361
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	COIL	BOILER	COAL	OTHER
ALL	2545	0	1336	0	-4938	2197
FUEL SAVINGS CASES ONLY	544	0	426	0	-72	1392
COST SAVINGS CASES ONLY	932	0	686	0	-1291	1381
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	544	0	426	0	-290	1361
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO.15 ADVANCED TECHNOLOGY GAS TURBINE DIRECT FIRED COAL (PFB)											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST		SAVINGS		*** STRATEGY MATCH-E		EMISSIONS SAVINGS		O1 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	FUEL SAVINGS	DOLLARS \$000	DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR TOTAL	
NO.01 MEAT PACKING	0.216	22.7	48.0	0.042	16484	1497130	0.379	-17694	51337	33643	4.30*
NO.02 BAKING	0.110	4.4	15.7	-0.195	-27878	524554	0.382	-7879	16786	8907	0.16*
NO.03 MALT BEVERAGE	0.130	9.2	18.9	0.190	50151	609258	0.235	-7187	20256	13069	1.31*
NO.04 WOVEN FABRIC MILL	0.030	3.3	77.8	-0.137	-54302	1709820	0.304	-52078	83275	31197	1.92*
NO.05 SAW MILL	-0.055	-6.1	91.7	-0.669	-342352	5138497	0.263	-68525	98163	29638	0.20*
NO.06 NEWSPRINT MILL	0.317	38.0	91.4	0.296	129162	796130	0.513	-36625	96292	59667	69.22
NO.07 WRITING PAPER MILL	0.312	34.7	59.1	0.313	153120	927730	0.464	-19561	74301	54741	17.86
NO.08 CORRUGATED PAPER	0.205	103.8	205.4	0.322	605020	2615655	0.344	-70790	218524	147734	45.14
NO.09 EOX BOARD	0.237	36.7	72.5	0.310	178554	915620	0.390	-24418	76864	52446	37.98
NO.10 CHLORINE	0.154	102.7	499.1	0.198	491608	4570921	0.393	-281209	540818	259610	44.95
NO.11 ALUMINA	0.068	7.5	32.0	0.136	60091	454714	0.191	-17575	34273	16698	16.32
NO.12 LOW DENS. POLYETHYL	-0.054	-9.4	148.6	0.006	3721	1516152	0.273	-110676	159056	48381	18.30
NO.13 HI DENS. POLYETHYL	0.128	9.8	53.7	0.147	41372	639187	0.364	-30809	57565	26756	9.29
NO.14 POLYVINYL CHLORIDE	0.183	21.1	73.7	0.186	78594	976042	0.390	-36757	78782	42024	6.64
NO.15 STYRENE-BUT. RUB.	0.115	2.2	4.2	0.189	13593	113882	0.195	-1634	4463	2830	1.44*
NO.16 NYLON	0.065	1.9	20.7	0.055	5835	299151	0.323	-13131	22168	9037	3.87*
NO.17 STYRENE	0.007	1.2	7.0	0.253	171926	292795	0.009	-6545	7532	986	3.28*
NO.18 ETHYLENE	0.007	8.1	16.2	0.368	1493219	1427494	-0.012	-26225	16628	-9598	3.55*
NO.19 PETROLEUM REFINING	0.051	208.6	293.3	0.362	5341460	7712359	0.065	-119382	313958	194077	21.45
NO.20 TIRES	0.213	23.3	55.8	0.183	74002	1069129	0.382	-22510	59693	37183	6.88
NO.23 INTEGRATED STEEL	0.024	111.0	487.4	0.021	225240	7222593	0.055	-256418	521814	265396	99.10
NO.24 GRAY IRON FOUNDRY	0.024	3.7	74.2	0.178	99242	899656	0.211	-50839	79390	28552	17.34
NO.25 COPPER	0.202	32.3	82.6	0.217	127663	1319073	0.370	-35759	88446	52688	5.49
NO.26 MOTOR VEHICLE	0.193	40.3	93.8	0.134	101213	1677031	0.393	-37522	100465	62943	10.01
TOTAL -- ALL					811	2623		-1352245	2820844	1468600	
FUEL SAVINGS CASES ONLY					827	2393		-1173044	2563624	1390582	
COST SAVINGS CASES ONLY					810	2438		-1223764	2622620	1396858	
EMISSIONS SAVINGS CASE ONLY					0	0		0	0	0	
FUEL & COST SAVINGS CASES					819	2289		-1113089	2463564	1350473	
FUEL,COST & EMISSION SAVING					0	0		0	0	0	

07

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1979

NO.15 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL(PFB)

*** STRATEGY MATCH-E

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10*12 BTU	10*12 BTU	10*12 BTU	10*12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TONS PER YEAR
TOTAL -- ALL	3030	9018			32228960	140399324			-4495271	9794866
FUEL SAVINGS CASES ONLY	3039	8101			32306544	122902144			-3811464	8312746
COST SAVINGS CASES ONLY	3027	8663			33042640	126267408			-4243997	9414908
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0
FUEL & COST SAVINGS CASES	3074	7921			33024064	118699264			-3696540	8620948
FUEL,COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10*12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE FUEL	GAS	COAL	OTHER	SAVINGS
TOTAL -- ALL	14654	-425	6082	0	0	-19478	2197	3030
FUEL SAVINGS CASES ONLY	14572	-425	6051	0	0	-19280	2171	3039
COST SAVINGS CASES ONLY	14621	-425	6051	0	0	-19387	2167	3027
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14554	-425	6028	0	0	-19237	2154	3074
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	-19478	2197	3030
FUEL SAVINGS CASES ONLY	14572	-425	6051	0	0	-19280	2171	3039
COST SAVINGS CASES ONLY	14621	-425	6051	0	0	-19387	2167	3027
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14554	-425	6028	0	0	-19237	2154	3074
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	-19478	2197	3030
FUEL SAVINGS CASES ONLY	14572	-425	6051	0	0	-19280	2171	3039
COST SAVINGS CASES ONLY	14621	-425	6051	0	0	-19387	2167	3027
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14554	-425	6028	0	0	-19237	2154	3074
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO.16 ADVANCED TECHNOLOGY, GAS TURBINE, INDIRECT FIRED, COAL/FB)									
INDUSTRY	FUEL ENERGY TOTAL		INDIRECT FIRED, COAL/FB)		SAVINGS		STRATEGY MATCH-E		01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS PLANT UTILITY	
NO.01 MEAT PACKING	-0.018	-1.9	48.0	-0.132	-51517	1664189	0.128	-39995	51337
NO.02 BAKING	-0.342	-13.7	15.7	-0.652	-93186	767970	-0.242	-22430	16786
NO.03 MALT BEVERAGE	0.131	9.3	18.9	0.151	39910	713855	0.202	-9049	20256
NO.04 WOVEN FABRIC MILL	-0.732	-78.8	77.8	-0.749	-296988	2289993	-0.346	-118705	83274
NO.05 SAW MILL	-0.938	-105.4	91.7	-1.329	-679821	6349942	-0.450	-148826	98163
NO.06 NEWSPRINT MILL	-0.364	-43.7	91.4	-0.180	-79352	1093150	-0.040	-100971	96292
NO.07 WRITING PAPER MILL	0.443	49.3	59.1	0.376	184096	1026776	0.536	-11145	74301
NO.08 CORRUGATED PAPER	0.351	177.3	205.4	0.339	637162	3580171	0.429	-34273	218524
NO.09 BOX BOARD	0.390	60.4	72.5	0.368	211873	1093176	0.478	-12604	76864
NO.10 CHLORINE	-0.517	-345.5	499.1	-0.272	-675180	6209962	-0.165	-649992	540819
NO.11 ALUMINA	0.054	6.0	32.0	0.123	54217	499993	0.144	-21667	34273
NO.12 LOW DENS. POLYETHYL	-0.822	-143.4	148.6	-0.539	-344203	2032892	-0.346	-220323	159056
NO.13 HI DENS. POLYETHYL	-0.456	-37.9	53.7	-0.300	-54383	843572	-0.168	-69890	57565
NO.14 POLYVINYL CHLORIDE	-0.357	-41.1	73.7	-0.194	-81948	1215168	-0.086	-88021	78782
NO.15 STYRENE-BUT. RUB.	0.117	2.2	4.2	0.164	11854	132342	0.168	-2022	4463
NO.16 NYLON	-0.569	-16.4	20.7	-0.403	-43002	381080	-0.217	-28251	22168
NO.17 STYRENE	0.008	1.6	7.0	0.251	170671	320071	0.005	-6972	7532
NO.18 ETHYLENE	0.015	17.3	16.2	0.369	1498829	1561813	-0.008	-22681	16628
NO.19 PETROLEUM REFINING	0.059	241.7	293.3	0.353	5213228	9441151	0.060	-135404	313959
NO.20 TIRES	-0.072	-7.9	55.8	-0.010	-4123	1192974	0.098	-50145	59693
NO.23 INTEGRATED STEEL	-0.072	-325.6	487.4	-0.111	-1181654	11261301	-0.017	-602154	521814
NO.24 GRAY IRON FOUNDRY	-0.413	-63.9	74.2	-0.142	-78958	1186558	-0.197	-106049	79390
NO.25 COPPER	-0.086	-13.8	32.6	0.010	5904	1543497	0.085	-76404	85446
NO.26 MOTOR VEHICLE	-0.069	-18.5	93.8	-0.076	-57750	2002234	0.075	-88420	100465
TOTAL -- ALL		-692	2623		4276682	59403728		-2666394	2820843
FUEL SAVINGS CASES ONLY		565	709		8021839	18369344		-255817	766800
COST SAVINGS CASES ONLY		551	791		6027742	19912832		-332220	855246
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0
FUEL & COST SAVINGS CASES		565	709		8021839	18369344		-255817	766800
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0

YEAR : 1990
 NO.16 ADVANCED TECHNOLOGY, GAS TURBINE, INDIRECT FIRED, COAL (AFB)
 NATIONAL SUMMARY
 *** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
TOTAL -- ALL	-1401	9018			10522049	172677184			-8412838	9794862	1382022	
FUEL SAVINGS CASES ONLY	2392	3109			28546689	72292048			-1060255	3477968	2417715	
COST SAVINGS CASES ONLY	2305	3267			28550000	75250624			-1206707	3647502	2440797	
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0	0	
FUEL & COST SAVINGS CASES	2392	3109			28546689	72292048			-1060255	3477968	2417715	
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
TOTAL -- ALL	14654	6082	0	0	-23909	-1401
FUEL SAVINGS CASES ONLY	12390	5078	0	0	-15866	2392
COST SAVINGS CASES ONLY	12390	5078	0	0	-16041	2365
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	12390	5078	0	0	-15866	2392
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
TOTAL -- ALL	14654	6082	0	0	-23909	-1401
FUEL SAVINGS CASES ONLY	12390	5078	0	0	-15866	2392
COST SAVINGS CASES ONLY	12390	5078	0	0	-16041	2365
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	12390	5078	0	0	-15866	2392
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL														
NO.17 ADVANCED TECHNOLOGY		FUEL ENERGY			CLOSED CYCLE, COAL DER. B.G.			STRATEGY MATCH-E			EMISSIONS SAVINGS			01
INDUSTRY	SAVINGS RATIO	TOTAL FUEL	SAVINGS	UTILITY	COST	SAVINGS DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	MATCH-E	TONS PER YEAR		TOTAL	ECS SIZE (MM)	
										PLANT	UTILITY			
NO.01 MEAT PACKING	0.281	29.5	49.0	-0.004	-1411	1012119	0.416	-14497	51337	36840	4.40*			
NO.02 BAKING	0.180	7.2	15.7	-0.341	-46676	597666	0.451	-6290	16786	10495	0.16*			
NO.03 MALT BEVERAGE	0.163	11.6	18.9	-0.005	-1235	408286	0.254	-6168	20256	14088	1.34*			
NO.04 WOVEN FABRIC MILL	0.223	24.0	77.8	-0.109	-43385	1185231	0.429	-39288	83275	43987	1.96*			
NO.05 SAW MILL	0.159	17.9	91.7	-0.627	-320632	4545026	0.394	-53738	98163	44425	0.20*			
NO.06 NEWSPRINT MILL	0.213	25.5	91.4	0.055	23784	574179	0.422	-47248	96292	49043	70.67			
NO.07 WRITING PAPER MILL	0.256	28.5	59.1	0.117	57445	622678	0.403	-26790	74301	47511	18.37			
NO.08 CORRUGATED PAPER	0.243	122.8	205.4	0.132	247056	1935954	0.359	-64249	218524	154275	46.23			
NO.09 BOX BOARD	0.279	43.2	72.5	0.152	87260	676478	0.406	-22303	76854	54561	38.88			
NO.10 CHLORINE	0.296	199.0	499.1	0.131	325105	3305001	0.479	-223907	540918	316911	46.03			
NO.11 ALUMINA	0.099	11.0	32.0	0.010	4619	329241	0.207	-16176	34273	18098	16.71			
NO.12 LCH DENS. POLYETHYL	0.105	18.2	148.6	-0.102	-65108	1083474	0.363	-94681	159056	64375	18.84			
NO.13 HI DENS. POLYETHYL	0.270	20.6	53.7	0.091	25684	421673	0.451	-24378	57565	33188	9.50			
NO.14 POLYVINYL CHLORIDE	0.263	30.3	73.7	0.086	36353	640204	0.432	-32161	78782	46621	6.79			
NO.15 STYRENE-BUT. RUB.	0.142	2.7	4.2	0.018	1273	77229	0.210	-1410	4463	3053	1.48*			
NO.16 NYLON	0.257	7.4	20.7	0.049	5248	192485	0.445	-9709	22168	12459	3.95*			
NO.17 STYRENE	0.011	2.1	7.0	-0.065	-43959	206045	0.012	-6155	7532	1377	3.44*			
NO.18 ETHYLENE	0.028	33.2	16.2	-0.002	-9161	523229	0.039	-9637	16628	6991	2.86*			
NO.19 PETROLEUM REFINING	0.063	258.0	293.3	0.020	288574	3734100	0.073	-95217	313958	218742	19.44			
NO.20 TIRES	0.281	30.7	55.8	0.080	32500	739555	0.417	-19026	59693	40667	7.04			
NO.23 INTEGRATED STEEL	0.042	190.1	487.4	0.017	181612	7103947	0.065	-207167	521814	314647	67.47			
NO.24 GRAY IRON FOUNDRY	-0.007	-1.1	74.2	-0.157	-87697	624427	0.170	-56316	79390	23075	17.96			
NO.25 COPPER	0.271	43.4	82.6	0.086	50286	953670	0.408	-30280	88446	58166	5.62			
NO.26 MOTOR VEHICLE	0.222	46.3	93.8	0.005	4096	1233139	0.402	-36116	100465	64350	10.27			
TOTAL -- ALL										-1142902	2820844	1677943		
FUEL SAVINGS CASES ONLY										-1086587	2741454	1654869		
COST SAVINGS CASES ONLY										-856134	2289423	1432291		
EMISSIONS SAVINGS CASE ONLY										0	0	0		
FUEL & COST SAVINGS CASES										-856134	2289423	1432291		
FUEL,COST & EMISSION SAVING										0	0	0		

YEAR : 1990
 NO.17 ADVANCED TECHNOLOGY,GAS TURBINE,CLOSED CYCLE, COAL DER. B.G. *** STRATEGY MATCH-E
 NATIONAL SUMMARY

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	PLANT	UTILITY	TOTAL
TOTAL -- ALL	3947	9018			3253400		98270440	-4096101	9794866	5695752
FUEL SAVINGS CASES ONLY	3947	8076			3421500		9707352	-3958156	9642691	5654523
COST SAVINGS CASES ONLY	3433	7576			4765340		72220416	-3192790	8162373	4989576
EMISSIONS SAVINGS CASE ONLY	0	0			0		0	0	0	0
FUEL & COST SAVINGS CASES	3433	7506			4765340		72220416	-3192790	8162373	4989576
FUEL,COST & EMISSION SAVING	0	0			0		0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS		DISTILLATE		PETROLEUM		FUEL OIL		BOILER FUEL		COAL		OTHER		TOTAL FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
TOTAL -- ALL	14654	-425	6052	0	0	0	0	0	0	0	7804	2197	2197	2197	3947	3947
FUEL SAVINGS CASES ONLY	14593	-425	6073	0	0	0	0	0	0	0	7659	2119	2119	2119	3949	3949
COST SAVINGS CASES ONLY	7400	-425	3979	0	0	0	0	0	0	0	6171	2032	2032	2032	3433	3433
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7400	-425	3979	0	0	0	0	0	0	0	6171	2032	2032	2032	3433	3433
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO.10 ADVANCED TECHNOLOGY, GAS TURBINE, CLOSED CYCLE, COAL (AFB)									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		SAVINGS		STRATEGY MATCH-E		01 ECS SIZE (MW)
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	FUEL SAVINGS	DOLLARS \$000	COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS PLANT	
NO.01 MEAT PACKING	0.257	26.9	46.0	0.137	53395	1339346	0.373	-18271	33066 4.48*
NO.02 BAKING	0.073	2.9	15.7	-0.458	-65367	891552	0.292	-9901	6805 0.17*
NO.03 MALT BEVERAGE	0.092	6.5	19.9	0.127	33512	727740	0.167	-10991	9265 1.39*
NO.04 MOVEN FABRIC MILL	-0.043	-4.6	77.8	-0.212	-84059	1966399	0.197	-63049	20225 2.03*
NO.05 SAW MILL	-0.121	-13.6	91.7	-1.111	-568393	7385178	0.162	-79969	98163 0.20*
NO.06 NEWSPRINT MILL	0.225	27.0	91.4	0.285	124175	754654	0.409	-48781	96292 47511 72.53
NO.07 WRITING PAPER MILL	0.376	41.9	59.1	0.352	172534	951639	0.480	-17708	74301 56593 18.90
NO.08 CORRUGATED PAPER	0.273	137.9	205.4	0.368	690979	2613820	0.361	-63713	218524 154811 47.47
NO.09 BOX BOARD	0.360	55.8	72.5	0.339	223572	914144	0.452	-16029	76864 68835 39.97
NO.10 CHLORINE	0.058	39.8	499.1	0.181	449629	4404310	0.276	-350162	540018 182657 47.34
NO.11 ALUMINA	0.021	2.3	32.0	0.107	47568	484468	0.113	-24429	34273 9845 17.33
NO.12 LOW DENS. POLYETHYL	-0.170	-29.6	148.6	-0.026	-16833	1524231	0.136	-134940	159056 24116 19.37
NO.13 HI DENS. POLYETHYL	0.010	0.8	53.7	0.115	32219	621679	0.228	-40810	57565 16755 9.80
NO.14 POLYVINYL CHLORIDE	0.063	7.2	73.7	0.141	59632	973205	0.250	-51795	76782 26986 7.00
NO.15 STYRENE-BUT. RUB.	0.084	1.6	4.2	0.142	10246	137143	0.138	-2456	4463 2003 1.53*
NO.16 NYLON	-0.017	-0.5	20.7	0.030	3228	308358	0.212	-16239	22168 5929 4.08*
NO.17 STYRENE	0.009	1.8	7.0	0.258	175208	290161	0.008	-6680	7532 852 3.38*
NO.18 ETHYLENE	0.009	10.8	16.2	0.391	1543629	1224623	-0.012	-26091	16628 -9464 2.55*
NO.19 PETROLEUM REFINING	0.026	107.3	293.3	0.368	5422376	6410485	0.031	-222681	313958 91277 19.85
NO.20 TILES	0.009	10.7	55.8	0.139	55923	1052146	0.241	-36202	59693 23490 7.29
NO.23 INTEGRATED STEEL	0.006	27.2	487.4	-0.004	-43097	8596213	0.038	-337410	521814 184404 69.51
NO.24 GRAY IRON FOUNDRY	-0.180	-27.8	74.2	0.078	43312	905708	0.007	-78474	79390 916 18.44
NO.25 COPPER	0.087	13.9	62.6	0.153	89701	1386408	0.230	-55667	88446 32780 5.81
NO.26 MOTOR VEHICLE	0.073	15.3	93.8	0.101	76780	1557698	0.239	-62267	100465 38198 10.58
TOTAL -- ALL		460	2623		8529555	47421392		-1782793	2820833 1038054
FUEL SAVINGS CASES ONLY		536	2210		9152600	35331600		-1410122	2378793 968674
COST SAVINGS CASES ONLY		479	1802		9307664	27057904		-1157446	1941750 764309
EMISSIONS SAVINGS CASES ONLY		0	0		0	0		0	0
FUEL & COST SAVINGS CASES		506	1707		9261065	25843840		-1062733	1840193 777464
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0	0

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YEAR : 1990
 1.0.18 ADVANCED TECHNOLOGY GAS TURBINE CLOSED CYCLE COAL/FEBI
 - COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY

*** STRATEGY MATCH-E

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU			COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS ----- TONS PER YEAR -----		
	10**12 BTU	UTILITY FUEL	SAVINGS	10**12 BTU	UTILITY FUEL	SAVINGS	10**12 BTU	PLANT	UTILITY	TOTAL
TOTAL -- ALL	2230	9016		31719072	144069792			-5666062	9793066	4120704
FUEL SAVINGS CASES ONLY	2463	7752		32961840	115955744			-4523459	8440247	3916775
COST SAVINGS CASES ONLY	2355	6937		33261504	100349589			-4052465	7620730	3566251
EMISSIONS SAVINGS CASE ONLY	0	0		0	0			0	0	0
FUEL & COST SAVINGS CASES	2410	6788		33169744	97769504			-3057579	7407853	3550264
FUEL, COST & EMISSION SAVING	0	0		0	0			0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU			COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	COAL	OTHER	FUEL	SAVINGS
TOTAL -- ALL	14654	-425	6082	0	0	-20270	2197
FUEL SAVINGS CASES ONLY	14479	-425	6020	0	0	-19694	2088
COST SAVINGS CASES ONLY	13029	-425	5454	0	0	-17265	1503
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	13013	-425	5441	0	0	-17043	1424
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	-20270	2197	2230
FUEL SAVINGS CASES ONLY	14479	-425	6020	0	0	-19694	2088	2460
COST SAVINGS CASES ONLY	13029	-425	5454	0	0	-17265	1503	2355
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	13013	-425	5441	0	0	-17043	1424	2410
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	-20270	2197	2230
FUEL SAVINGS CASES ONLY	14479	-425	6020	0	0	-19694	2088	2463
COST SAVINGS CASES ONLY	13029	-425	5454	0	0	-17265	1503	2355
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	13013	-425	5441	0	0	-17043	1424	2410
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 19 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIP. FIRED, PETROLEUM B.G.									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS		01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	UTILITY SAVINGS	RATIO	\$000	\$000	PLANT RATIO	TONS PER YEAR UTILITY	----- TOTAL
NO. 01 MEAT PACKING	0.195	20.5	48.0	0.064	24761	393772	0.379	-19160	32177 4.30*
NO. 02 BAKING	0.166	6.7	15.7	-0.067	-9522	177544	0.472	-6099	16766 0.16*
NO. 03 MALT BEVERAGE	0.115	6.2	18.9	0.032	8383	172331	0.238	-7877	20256 12300 1.31*
NO. 04 KOVEN FABRIC MILL	0.300	32.3	77.8	0.140	55624	440956	0.526	-30421	83274 52853 1.90*
NO. 05 SAW MILL	0.277	31.1	91.7	-0.017	-8641	1854001	0.521	-40240	98163 57924 0.20*
NO. 06 NEWSPRINT MILL	0.208	34.5	91.4	0.193	54101	214322	0.517	-37253	96292 59039 69.01
NO. 07 WRITING PAPER MILL	0.220	24.5	59.1	0.143	69915	264784	0.412	-27541	74301 46760 17.98
NO. 08 CORRUGATED PAPER	0.166	83.9	205.4	0.104	195830	844991	0.330	-84076	218524 134448 45.49
NO. 09 BOX BOARD	0.190	29.5	72.5	0.122	70104	281671	0.370	-29305	76864 47560 38.26
NO. 10 CHLORINE	0.372	248.9	493.1	0.276	684158	1172723	0.571	-170486	540819 370333 44.64
NO. 11 ALUMINA	0.050	5.5	32.0	0.003	1499	131241	0.189	-18292	34273 15982 16.43
NO. 12 LOW DENS. POLYETHYL	0.244	42.6	148.6	0.126	60528	394322	0.507	-70090	159056 88966 18.17
NO. 13 HI DENS. POLYETHYL	0.299	22.9	53.7	0.196	55671	163138	0.512	-20782	57505 36784 9.24*
NO. 14 POLYETHYL CHLORIDE	0.273	31.4	73.7	0.169	71407	267181	0.478	-28602	78782 50179 6.62*
NO. 15 STYRENE-BUT. RUB.	0.102	1.9	4.2	0.033	2393	34580	0.195	-1787	4463 2677 1.45*
NO. 16 NYLON	0.304	8.8	20.7	0.189	20107	76510	0.519	-7953	22168 14214 3.84*
NO. 17 STYRENE	0.004	0.7	7.0	-0.067	-45230	161803	0.011	-6456	7532 1076 3.39*
NO. 18 ETHYLENE	0.015	17.1	16.2	-0.024	-96178	644303	-0.003	-10802	16628 -2174 3.91*
NO. 19 PETROLEUM REFINING	0.045	185.2	293.3	-0.005	-73274	3631939	0.066	-135500	313958 178458 21.01
NO. 20 TIRES	0.218	23.9	55.8	0.120	48438	289166	0.404	-21850	59693 37842 6.90*
NO. 23 INTEGRATED STEEL	0.043	196.5	487.4	0.050	537056	3508153	0.070	-183699	521814 338115 98.65
NO. 24 GRAY IRON FOUNDRY	0.191	29.6	74.2	0.104	50823	231982	0.372	-31112	79390 48279 17.23
NO. 25 COPPER	0.221	35.4	82.6	0.123	72592	369218	0.406	-32893	88446 55554 5.50*
NO. 26 MOTOR VEHICLE	0.192	40.1	93.8	0.073	55080	433071	0.412	-37002	100465 63463 10.04
TOTAL -- ALL		1162	2623		1962181	16206700		-1067276	2820844 1753571
FUEL SAVINGS CASES ONLY		1162	2623		1962181	16206700		-1067276	2820844 1753571
EMISSIONS SAVINGS CASES ONLY		921	2193		2195027	9237105		-860179	2367779 1507602
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0
FUEL & COST SAVINGS CASES		921	2193		2195027	9237106		-860179	2367779 1507602
FUEL, COST & EMISSIONS SAVINGS		0	0		0	0		0	0

YEAR : 1990
 NO. 19 ADVANCED TECHNOLOGY STEAM INJECT. G/T. DIP. FIRED. PETROLEUM D.G. *** STRATEGY MATCH-E
 NATIONAL SUMMARY

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR			
									PLANT	UTILITY	TOTAL	
TOTAL -- ALL	3782	9013	6654964	48095640	-3843620	9794366	5951234					
FUEL SAVINGS CASES ONLY	3782	9018	6654964	48095640	-3843620	9794366	5951234					
COST SAVINGS CASES ONLY	3226	8106	7698957	31550256	-3333666	8623563	5489864					
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0					
FUEL & COST SAVINGS CASES	3226	8106	7698957	31550256	-3333666	8623563	5489864					
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0					

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR			
									PLANT	UTILITY	TOTAL	
TOTAL -- ALL	3782	9013	6654964	48095640	-3843620	9794366	5951234					
FUEL SAVINGS CASES ONLY	3782	9018	6654964	48095640	-3843620	9794366	5951234					
COST SAVINGS CASES ONLY	3226	8106	7698957	31550256	-3333666	8623563	5489864					
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0					
FUEL & COST SAVINGS CASES	3226	8106	7698957	31550256	-3333666	8623563	5489864					
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0					

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR			
									PLANT	UTILITY	TOTAL	
TOTAL -- ALL	3782	9013	6654964	48095640	-3843620	9794366	5951234					
FUEL SAVINGS CASES ONLY	3782	9018	6654964	48095640	-3843620	9794366	5951234					
COST SAVINGS CASES ONLY	3226	8106	7698957	31550256	-3333666	8623563	5489864					
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0					
FUEL & COST SAVINGS CASES	3226	8106	7698957	31550256	-3333666	8623563	5489864					
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0					

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR			
									PLANT	UTILITY	TOTAL	
TOTAL -- ALL	3782	9013	6654964	48095640	-3843620	9794366	5951234					
FUEL SAVINGS CASES ONLY	3782	9018	6654964	48095640	-3843620	9794366	5951234					
COST SAVINGS CASES ONLY	3226	8106	7698957	31550256	-3333666	8623563	5489864					
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0					
FUEL & COST SAVINGS CASES	3226	8106	7698957	31550256	-3333666	8623563	5489864					
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0					

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E				EMISSIONS SAVINGS		ECS	
NO.20 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIR-FIRED, COAL DER. B.G.										CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	SAVINGS \$000	COST \$000	---- TONS PER YEAR ----		TOTAL SAVINGS \$000	TOTAL SAVINGS \$000
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS	COAL SAVINGS	DIR-FIRED SAVINGS	STEAM INJECT. SAVINGS	COAL DER. SAVINGS	B.G. SAVINGS	SAVINGS RATIO					PLANT	UTILITY		
NO.01 MEAT PACKING	0.195	20.5	48.0	0.064	24781					393772	0.343	-20907	51337	30431	4.30*		
NO.02 BAKING	0.166	6.7	15.7	-0.067	-9522					177544	0.435	-6651	16706	10134	0.16*		
NO.03 MALT BEVERAGE	0.115	8.2	10.9	0.032	8383					172331	0.210	-8602	20256	11654	1.31*		
NO.04 WOVEN FABRIC MILL	0.300	32.3	77.8	0.140	55624					440956	0.409	-33182	83275	50093	1.90*		
NO.05 SAW MILL	0.277	31.1	91.7	-0.017	-8641					1854001	0.481	-44039	8163	54125	0.20*		
NO.06 NEWSPRINT MILL	0.268	34.5	91.4	0.193	84101					214322	0.479	-40682	96292	55609	69.01		
NO.07 WRITING PAPER MILL	0.220	24.5	59.1	0.143	69315					264784	0.375	-30050	74301	44251	17.98		
NO.08 CORRUGATED PAPER	0.166	83.9	205.4	0.104	195830					844991	0.295	-91808	218524	126716	45.49		
NO.09 BOX BOARD	0.190	29.5	72.5	0.122	70104					284671	0.334	-31993	76864	44871	38.26		
NO.10 CHLORINE	0.372	248.9	499.1	0.276	684159					1172723	0.537	-185788	540818	355030	44.64		
NO.11 ALUMINA	0.050	5.5	32.0	0.003	1499					131241	0.162	-20090	34273	14183	16.43		
NO.12 LOW DENS. POLYETHYL	0.244	42.6	148.6	0.126	80528					394322	0.464	-76802	159056	82254	18.17		
NO.13 HI DENS. POLYETHYL	0.299	22.9	53.7	0.196	55071					163138	0.475	-22662	57565	34904	9.24*		
NO.14 POLYVINYL CHLORIDE	0.273	31.4	73.7	0.169	71407					267181	0.441	-31194	78782	47588	6.62*		
NO.15 STYRENE-BUT. RUB.	0.102	1.9	4.2	0.033	2393					34580	0.173	-1952	4463	2511	1.45*		
NO.16 NYLON	0.304	8.8	20.7	0.189	20107					76510	0.482	-8672	22168	13496	3.84*		
NO.17 STYRENE	0.004	0.7	7.0	-0.067	-45230					161803	0.004	-7129	7532	403	3.39*		
NO.18 ETHYLENE	0.015	17.1	16.2	-0.024	-96181					694302	-0.005	-20720	16628	-4092	3.91*		
NO.19 PETROLEUM REFINING	0.046	186.1	293.3	-0.005	-69693					3631284	0.056	-147180	313958	166779	21.81		
NO.20 TIRES	0.218	23.9	55.8	0.120	48438					289166	0.368	-23835	59693	35858	6.90*		
NO.23 INTEGRATED STEEL	0.043	196.5	487.4	0.050	537096					3508153	0.066	-201930	521814	319885	98.65		
NO.24 GRAY IRON FOUNDRY	0.190	29.4	74.2	0.103	57307					232014	0.334	-34157	79390	45234	17.23		
NO.25 COPPER	0.221	35.4	82.6	0.123	72592					369218	0.369	-35891	58446	52556	5.50*		
NO.26 MOTOR VEHICLE	0.192	40.1	93.8	0.073	55080					433071	0.375	-40367	100465	60098	10.04		
TOTAL -- ALL		1162	2623		1965042					16206071		-1166278	2820844	1654566			
FUEL SAVINGS CASES ONLY		1162	2623		1965042					16206071		-1166278	2820844	1654566			
COST SAVINGS CASES ONLY		921	2199		2194311					9687137		-940563	2367779	1427218			
EMISSIONS SAVINGS CASE ONLY		0	0		0					0		0	0	0			
FUEL & COST SAVINGS CASES		921	2199		2194311					9687137		-940563	2367779	1427218			
FUEL, COST & EMISSION SAVING		0	0		0					0		0	0	0			

YEAR : 1990
 NO.20 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIR. FIRED, COAL DER. B.G. *** STRATEGY MATCH-E
 - COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY

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CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS PLANT TONS PER YEAR	TOTAL
TOTAL -- ALL	3784	9018	6660433	48094608	-4201059	5593793
FUEL SAVINGS CASES ONLY	3784	9018	6660433	48094608	-4201059	5593793
COST SAVINGS CASES ONLY	3226	8106	7697584	31550320	-3643864	5179687
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	3226	8106	7697584	31550320	-3643864	5179687
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---					TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE FUEL	PETROLEUM BOILER FUEL	COAL DISTILLATE BOILER FUEL	COAL FUEL	
TOTAL -- ALL	14654	-425	6092	0	7804	3784
FUEL SAVINGS CASES ONLY	14654	-425	6092	0	7804	3784
COST SAVINGS CASES ONLY	3099	-425	2273	0	6448	3226
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	3099	-425	2273	0	6448	3226
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION	0	0	0	0	0	0
TOTAL -- ALL	0	0	0	0	-1077	1119
FUEL SAVINGS CASES ONLY	0	0	0	0	-1077	1119
COST SAVINGS CASES ONLY	0	0	0	0	659	1489
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	659	1489
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E			EMISSIONS SAVINGS		01	
NO. 21 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIRECT FIRED, COAL (PFB)										CAPITAL COST \$000	SAVINGS RATIO	EMISSIONS PLANT UTILITY	SAVINGS PER YEAR	----- TOTAL	ECS SIZE (MM)	
INDUSTRY	FUEL ENERGY SAVINGS RATIO	FUEL ENERGY TOTAL SAVINGS	UTILITY SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	EMISSIONS PLANT UTILITY	SAVINGS PER YEAR	----- TOTAL	ECS SIZE (MM)					
NO. 01 MEAT PACKING	0.073	7.7	48.0	0.012	4744	1339354	0.252	-28992	51337	22345	4.33*					
NO. 02 BAKING	0.063	2.5	15.7	-0.196	-28047	492186	0.322	-9277	16786	7509	0.16*					
NO. 03 MALT BEVERAGE	0.037	2.6	18.9	0.166	43790	549663	0.146	-12162	20256	8094	1.32*					
NO. 04 WOVEN FABRIC MILL	0.070	7.5	77.8	-0.091	-36010	1654660	0.332	-49236	83275	34039	1.92*					
NO. 05 SAW MILL	0.099	11.2	91.7	-0.558	-285329	4958789	0.371	-56396	98163	41767	0.20*					
NO. 06 NEWSPRINT MILL	0.137	16.4	91.4	0.195	84881	802844	0.385	-51537	96292	44754	69.48					
NO. 07 WRITING PAPER MILL	0.093	10.3	59.1	0.225	110014	814348	0.287	-40453	74301	33848	18.07					
NO. 08 CORRUGATED PAPER	0.071	36.1	205.4	0.274	514112	2283310	0.227	-121316	218524	97208	45.67					
NO. 09 BOX BOARD	0.083	12.8	72.5	0.255	146615	798280	0.258	-42204	76864	34661	38.43					
NO. 10 CHLORINE	0.146	97.8	499.1	0.198	492424	4596127	0.307	-284703	540818	256116	44.99					
NO. 11 ALUMINA	-0.035	-3.8	32.0	0.100	44115	401678	0.094	-26094	34273	8179	16.52					
NO. 12 LOW DENS. POLYETHYL	-0.003	-0.6	148.6	0.050	31639	1497132	0.307	-104740	159056	54317	18.31					
NO. 13 HI DENS. POLYETHYL	0.076	5.8	53.7	0.121	33939	642330	0.324	-33750	57565	23815	9.31*					
NO. 14 POLYVINYL CHLORIDE	0.079	9.1	73.7	0.132	55971	969972	0.308	-45520	78782	33262	6.67*					
NO. 15 STYRENE-BUT. RUB.	0.038	0.7	4.2	0.164	11661	103791	0.119	-2734	4463	1729	1.46*					
NO. 16 NITRO	0.089	2.5	20.7	0.083	6848	292441	0.339	-12713	22168	9455	3.87*					
NO. 17 STYRENE	-0.005	-1.0	7.0	0.249	169103	278789	-0.006	-8222	7532	-690	3.30*					
NO. 18 ETHYLENE	0.000	0.4	16.2	0.366	1482850	1389321	-0.019	-31772	16628	-15144	3.56*					
NO. 19 PETROLEUM REFINING	0.021	85.8	293.3	0.351	5180326	7020856	0.034	-211789	313958	102169	21.61					
NO. 20 TIRES	0.065	7.1	55.8	0.129	52397	982929	0.257	-34608	59693	25035	6.94*					
NO. 23 INTEGRATED STEEL	0.010	47.2	487.4	0.009	94044	7271003	0.045	-301099	521814	220716	99.42					
NO. 24 GRAY IRON FOUNDRY	0.051	7.9	74.2	0.205	114335	876980	0.231	-48019	79390	31371	17.33					
NO. 25 COPPER	0.066	10.5	82.6	0.156	92006	1254897	0.257	-51871	86446	36575	5.54*					
NO. 26 MOTOR VEHICLE	0.057	11.9	93.8	0.075	56990	1507564	0.262	-50517	100465	41948	10.11					
TOTAL -- ALL										42639616	-1667717	2850844	1153128			
FUEL SAVINGS CASES ONLY										40662043	-1528662	2619994	1091323			
COST SAVINGS CASES ONLY										35734064	-1552809	2622620	1069813			
EMISSIONS SAVINGS CASE ONLY										0	0	0	0			
FUEL & COST SAVINGS CASES										33556464	-1413754	2421760	1008008			
FUEL, COST & EMISSIONS SAVINGS										0	0	0	0			

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO.21 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIRECT FIRED, COAL (PFB) *** STRATEGY MATCH-E 07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	1249	9018			29541136	133236784			-5843766	3951086
FUEL SAVINGS CASES ONLY	1295	7920			28329164	120617632			-5021552	3597648
COST SAVINGS CASES ONLY	1208	8663			30210832	119616624			-5623509	3791387
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0
FUEL & COST SAVINGS CASES	1255	7565			28998896	106997468			-4801295	3437949
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	6082	0	0	0	-21259	2197
FUEL SAVINGS CASES ONLY	13376	-17	5513	0	0	0	-20229	2153
COST SAVINGS CASES ONLY	14621	-425	6051	0	0	0	-21206	2167
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	13343	-17	5482	0	0	0	-20176	2123
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	0	-21259	2197	1249
FUEL SAVINGS CASES ONLY	13376	-17	5513	0	0	0	-20229	2153	1295
COST SAVINGS CASES ONLY	14621	-425	6051	0	0	0	-21206	2167	1208
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	13343	-17	5482	0	0	0	-20176	2123	1255
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	0	-21259	2197	1249
FUEL SAVINGS CASES ONLY	13376	-17	5513	0	0	0	-20229	2153	1295
COST SAVINGS CASES ONLY	14621	-425	6051	0	0	0	-21206	2167	1203
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	13343	-17	5482	0	0	0	-20176	2123	1255
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO.22 ADVANCED TECHNOLOGY,STEAM INJECTED G/T,INDIRECT FIRED,COAL(AFB)											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		FIRED,COAL(AFB)		*** STRATEGY MATCH-E		EMISSIONS SAVINGS		01 ECS SIZE (HJ)
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	COST DOLLARS \$000	SAVINGS RATIO	COST DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	SAVINGS PER YEAR TOTAL	
NO.01 MEAT PACKING	0.095	9.9	48.0	0.046	17808	1303954	0.235	-30492	51337	20845	4.49*
NO.02 BAKING	-0.017	-0.7	15.7	-0.254	-36206	516917	0.160	-12599	16766	4187	0.17*
NO.03 MALT BEVERAGE	-0.020	-1.4	18.9	0.133	35140	564629	0.071	-16307	20256	3949	1.37*
NO.04 WOVEN FABRIC MILL	-0.087	-9.3	77.8	-0.178	-70565	1694344	0.164	-66482	83274	16792	2.00*
NO.05 SAW MILL	-0.083	-9.3	91.7	-0.660	-337566	5123423	0.190	-76741	98163	21422	0.20*
NO.06 NEWSPRINT MILL	-0.019	-2.3	91.4	0.119	51779	802833	0.223	-70399	96292	25893	72.31
NO.07 WRITING PAPER MILL	0.002	0.2	59.1	0.182	89334	819629	0.176	-53539	74301	20762	18.78
NO.08 CORRUGATED PAPER	0.050	25.4	205.4	0.273	512318	2245018	0.178	-142229	218524	76295	47.31
NO.09 BOX BOARD	0.050	7.7	72.5	0.248	142666	788974	0.196	-50505	76864	26359	39.83
NO.10 CHLORINE	-0.014	-9.1	499.1	0.121	299395	4562275	0.221	-394504	540818	146314	46.83
NO.11 ALUMINA	-0.095	-10.6	32.0	0.071	31601	406097	0.014	-33023	34273	1250	17.18
NO.12 LOW DENS. POLYETHYL	-0.213	-37.2	143.6	-0.071	-45502	1560916	0.104	-140662	159056	18394	19.04
NO.13 HI DENS. POLYETHYL	-0.077	-5.8	53.7	0.049	13665	632200	0.162	-45667	57565	11898	9.70*
NO.14 POLYVINYL CHLORIDE	-0.057	-6.6	73.7	0.065	27458	969899	0.158	-61694	78782	17088	6.94*
NO.15 STYRENE-BUT. RUB.	-0.009	-0.2	4.2	0.139	10056	106229	0.057	-3642	4463	822	1.52*
NO.16 NYLON	-0.065	-1.9	20.7	0.008	810	292317	0.175	-17266	22168	4902	4.03*
NO.17 STYRENE	-0.003	-0.6	7.0	0.252	170749	281011	-0.008	-8391	7532	-860	3.39*
NO.18 ETHYLENE	0.009	10.7	16.2	0.372	1507409	1394026	-0.012	-26095	16628	-9467	3.61*
NO.19 PETROLEUM REFINING	0.038	155.1	293.3	0.364	5369479	7012047	0.044	-183313	313953	130646	22.21
NO.20 TYPES	-0.044	-4.8	55.8	0.077	31248	990904	0.132	-46832	59693	12861	7.23*
NO.23 INTEGRATED STEEL	-0.013	-58.1	487.4	-0.009	-96066	7266352	0.025	-401435	521614	120379103.45	
NO.24 GRAY IRON FOUNDRY	-0.049	-7.6	74.2	0.153	85427	897681	0.115	-63782	79390	15608	18.00
NO.25 COPPER	-0.044	-7.1	82.6	0.102	60234	1254527	0.129	-70005	68446	18441	5.76*
NO.26 MOTOR VEHICLE	-0.039	-8.1	93.8	0.032	24297	1535330	0.133	-79103	100465	21362	10.52

TOTAL -- ALL		28	2623		7894164	43001328		-2094702	2820843	726141	
FUEL SAVINGS CASES ONLY		209	694		7639013	13583548		-486173	751612	265439	
COST SAVINGS CASES ONLY		143	1902		8490065	26639440		-1396786	1941750	544967	
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0	
FUEL & COST SAVINGS CASES		209	694		7639013	13563548		-486173	751612	265439	
FUEL,COST & EMISSIONS SAVING		0	0		0	0		0	0	0	

YEAR : 1996
 CO-GENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY
 NATIONAL SUMMARY
 *** STRATEGY MATCH-E

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CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	TOTAL
TOTAL -- ALL	-93	9018	27276720	133736032	-7412229	2382633
FUEL SAVINGS CASES ONLY	534	2787	25441952	50795808	-2185453	948630
COST SAVINGS CASES ONLY	241	6987	28539596	97957040	-5641932	1978799
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	534	2787	25441952	50795808	-2185453	948630
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM DISTILLATE FUEL	COAL DISTILLATE FUEL	BOILER FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14654	-425	6082	0	-22601	-93
FUEL SAVINGS CASES ONLY	11489	0	4513	0	-16780	534
COST SAVINGS CASES ONLY	13063	-425	5454	0	-19379	241
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	11489	0	4513	0	-16780	534
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-22601	2197	-93
FUEL SAVINGS CASES ONLY	11489	0	4513	0	-16780	1313	534
COST SAVINGS CASES ONLY	13063	-425	5454	0	-19379	1503	241
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	11489	0	4513	0	-16780	1313	534
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION							
TOTAL -- ALL	14654	-425	6082	0	-22601	2197	-93
FUEL SAVINGS CASES ONLY	11489	0	4513	0	-16780	1313	534
COST SAVINGS CASES ONLY	13063	-425	5454	0	-19379	1503	241
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	11489	0	4513	0	-16780	1313	534
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL															
NO. 23 ADVANCED TECHNOLOGY, C.C.		FUELED CYCLE DIRECT FIRED PETROLEUM B.G.				*** STRATEGY MATCH-E				EMISSIONS SAVINGS		ECS SIZE			
INDUSTRY	FUEL ENERGY SAVING RATIO	TOTAL FUEL SAVING	UTILITY FUEL SAVING	COST DOLLARS \$000	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR	TOTAL	-----	TOTAL	(MM)		
PRO-01 HEAT PACKING	0.207	21.7	48.0	0.007	2692	664418	0.389	-18312	51337	33025	4.32*				
PRO-02 BAKING	0.177	7.1	15.7	-0.247	-35242	449316	0.485	-5822	16786	10963	0.16*				
PRO-03 MALT BEVERAGE	0.122	8.7	18.9	-0.010	-2574	301629	0.245	-7541	20256	12715	1.32*				
PRO-04 KOVEN FABRIC MILL	0.366	35.1	77.8	0.052	20644	901280	0.544	-28539	83274	54736	1.91*				
PRO-05 SAW MILL	0.403	45.3	91.7	-0.274	-140203	3682220	0.605	-30935	98163	67228	0.20*				
PRO-06 NEWSPRINT MILL	0.340	40.9	91.4	0.227	99084	305320	0.553	-33150	96292	63142	69.38				
PRO-07 WRITING PAPER MILL	0.234	26.0	59.1	0.134	65486	382885	0.423	-26333	74301	47968	18.07				
PRO-08 CORRUGATED PAPER	0.176	89.2	205.4	0.103	194028	1084796	0.339	-80512	218524	138011	45.72				
PRO-09 BOX BOARD	0.202	31.3	72.5	0.120	68869	374924	0.380	-28052	76864	48812	38.46				
PRO-10 CHLORINE	0.389	260.4	499.1	0.272	674450	1766361	0.582	-162881	540819	377938	44.88				
PRO-11 ALUMINA	0.057	6.3	32.0	-0.002	-1029	190581	0.195	-17740	34273	16533	16.51				
PRO-12 LOW DENS. POLYETHYL	0.339	59.1	148.6	0.185	118025	645484	0.569	-59303	159056	99753	18.26				
PRO-13 HI DENS. POLYETHYL	0.317	24.3	53.7	0.174	48974	281577	0.525	-19849	57565	37716	9.29*				
PRO-14 POLYVINYL CHLORIDE	0.289	33.3	73.7	0.140	59139	468155	0.491	-27325	78782	51457	6.65*				
PRO-15 STYRENE-BUT. RUB.	0.108	2.0	4.2	0.006	411	58740	0.200	-1714	4463	2750	1.46*				
PRO-16 NYLON	0.323	9.3	20.7	0.149	15864	140905	0.532	-7594	22168	14573	3.86*				
PRO-17 STYRENE	0.005	0.9	7.0	-0.069	-47146	188885	0.012	-6326	7532	1266	3.40*				
PRO-18 ETHYLENE	0.007	8.2	16.2	-0.042	-168409	1016333	-0.011	-24346	16628	-7718	4.78*				
PRO-19 PETROLEUM REFINING	0.052	211.5	293.3	0.000	259	4004742	0.072	-118176	313958	195782	21.55				
PRO-20 TILES	0.231	25.3	55.8	0.087	35219	479999	0.415	-20882	59693	38811	6.93*				
PRO-23 INTEGRATED STEEL	0.046	207.7	487.4	0.050	531504	4039773	0.071	-176387	521814	345427	99.18				
PRO-24 GRAY IRON FOUNDRY	0.285	44.2	74.2	0.176	98216	375447	0.445	-21602	79390	57788	17.32				
PRO-25 COPTER	0.234	37.5	82.6	0.095	55814	624678	0.416	-31456	88446	56990	5.53*				
PRO-26 MOTOR VEHICLE	0.204	42.5	93.8	0.051	38905	694009	0.422	-35371	100465	65094	10.09				

TOTAL -- ALL		1278	2823		1732973	23122400		-990148	2820944	1830696					
FUEL SAVING CASES ONLY		1278	2823		1732973	23122400		-990148	2820944	1830696					
COST SAVING CASES ONLY		1201	2441		2127575	17293472		-897433	2627203	1729771					
EMISSIONS SAVING CASE ONLY		0	0		0	0		0	0	0					
FUEL & COST SAVING CASES		1201	2441		2127575	17293472		-897433	2627208	1729771					
FUEL,COST & EMISSION SAVING		0	0		0	0		0	0	0					

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.23 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, PETROLEUM B.G.

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR			
						PLANT	UTILITY	TOTAL	

TOTAL -- ALL	4147	9018		5968700	69238320	-3598524	9794866	6196331	
FUEL SAVINGS CASES ONLY	4147	9018		5968700	69238320	-3598524	9794866	6196331	
COST SAVINGS CASES ONLY	3900	8300		7728599	50606736	-3127991	9031424	5903423	
EMISSIONS SAVINGS CASE ONLY	0	0		0	0	0	0	0	
FUEL & COST SAVINGS CASES	3900	8300		7728599	50606736	-3127991	9031424	5903423	
FUEL, COST & EMISSION SAVING	0	0		0	0	0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	GAS	COAL	OTHER	FUEL
TOTAL -- ALL	14654	-425	-20083	0	7804	2197
FUEL SAVINGS CASES ONLY	14654	-425	-20083	0	7804	2197
COST SAVINGS CASES ONLY	7194	-17	-12434	0	7028	2130
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7194	-17	-12434	0	7028	2130
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	-20083	0	0	7804	2197	4147
FUEL SAVINGS CASES ONLY	14654	-425	-20083	0	0	7804	2197	4147
COST SAVINGS CASES ONLY	7194	-17	-12434	0	0	7028	2130	3900
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7194	-17	-12434	0	0	7028	2130	3900
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	-20083	0	0	7804	2197	4147
FUEL SAVINGS CASES ONLY	14654	-425	-20083	0	0	7804	2197	4147
COST SAVINGS CASES ONLY	7194	-17	-12434	0	0	7028	2130	3900
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7194	-17	-12434	0	0	7028	2130	3900
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO. 24 ADVANCED TECHNOLOGY, COND. CYCLE, DIRECT FIRED, COAL DER. B.G.											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY FUEL		COST		B.G.		*** STRATEGY MATCH-E		EMISSIONS SAVINGS ----- TONS PER YEAR ----- PLANT UTILITY TOTAL
	SAVINGS RATIO	SAVINGS	SAVINGS	FUEL	RATIO	DOLLARS \$000	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO		
NO. 01 MEAT PACKING	0.207	21.7	48.0	0.007	2692	664418	0.353	-20012	51337	31325	4.32*
NO. 02 BAKING	0.177	7.1	15.7	-0.247	-35242	449316	0.448	-6359	16786	10427	0.16*
NO. 03 MALT BEVERAGE	0.122	8.7	18.9	-0.010	-2574	301629	0.216	-8248	20256	12008	1.32*
NO. 04 MOVEN FABRIC MILL	0.326	35.1	77.8	0.052	20644	901280	0.508	-31164	83275	52111	1.91*
NO. 05 SAW MILL	0.403	45.3	91.7	-0.274	-140203	3682220	0.571	-33810	98163	64353	0.20*
NO. 06 NEWSRINT MILL	0.340	40.9	91.4	0.227	99084	305320	0.517	-36203	96292	60099	69.38
NO. 07 WRITING PAPER MILL	0.234	26.0	59.1	0.134	65486	382885	0.386	-28776	74301	45525	18.07
NO. 08 CORRUGATED PAPER	0.176	69.2	205.4	0.103	194028	1084796	0.304	-88047	218524	130476	45.72
NO. 09 BOX BOARD	0.202	31.3	72.5	0.120	68869	374924	0.343	-30672	76864	46193	38.46
NO. 10 CHLORINE	0.389	260.4	499.1	0.272	674450	1766361	0.550	-177428	540818	363390	44.88
NO. 11 ALUMINA	0.057	6.3	32.0	-0.002	-1029	190581	0.169	-19588	34273	14765	16.51
NO. 12 LOW DENS. POLYETHYL	0.339	59.1	148.6	0.185	118025	645484	0.531	-64949	159056	94107	18.26
NO. 13 HI DENS. POLYETHYL	0.317	24.3	53.7	0.174	48974	281577	0.488	-21678	57565	35888	9.29*
NO. 14 POLYVINYL CHLORIDE	0.289	33.3	73.7	0.140	59139	468155	0.454	-29846	78782	48935	6.65*
NO. 15 STYRENE-EXT. RUB.	0.108	2.0	4.2	0.006	411	58740	0.178	-1876	4463	2588	1.46*
NO. 16 NYLON	0.323	9.3	20.7	0.149	15864	140905	0.496	-8293	22168	13875	3.86*
NO. 17 STYRENE	0.005	0.9	7.0	-0.069	-47146	188885	0.005	-6991	7532	541	3.40*
NO. 18 ETHYLENE	0.007	8.2	16.2	-0.042	-168409	1016334	-0.013	-26879	16628	-10251	4.78*
NO. 19 PETROLEUM REFINING	0.052	213.6	293.3	0.001	8427	4003752	0.063	-127375	313958	186583	21.55
NO. 20 TIRES	0.231	25.3	55.8	0.087	35219	479999	0.378	-22813	58693	36880	6.93*
NO. 23 INTEGRATED STEEL	0.046	207.7	487.4	0.050	531504	4039773	0.067	-193892	521814	327922	99.18
NO. 24 GRAY IRON FOUNDRY	0.288	44.6	74.2	0.179	99874	375613	0.415	-23178	79390	56213	17.32
NO. 25 COPPER	0.234	37.5	82.6	0.095	55814	624678	0.379	-34375	88446	54071	5.53*
NO. 26 MOTOR VEHICLE	0.204	42.5	93.8	0.051	38905	694009	0.386	-38647	100465	61818	10.09

TOTAL -- ALL		1280	2623		1742800	23121376		-1081017	2820843	1739829	
FUEL SAVINGS CASES ONLY		1280	2623		1742800	23121376		-1081017	2820843	1739829	
COST SAVINGS CASES ONLY		1204	2441		2137403	17292448		-979223	2627207	1647987	
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0	
FUEL & COST SAVINGS CASES		1204	2441		2137403	17292448		-979223	2627207	1647987	
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 24 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, COAL DER. B.G.

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS	DOLLARS	\$000	\$000	PLANT	TONS PER YEAR
TOTAL -- ALL	4152	9018			5987533		69236304		-3933191	9794864
FUEL SAVINGS CASES ONLY	4152	9018			5987533		69236384		-3933191	9794864
COST SAVINGS CASES ONLY	3905	8300			7747427		50604768		-3415424	9031422
EMISSIONS SAVINGS CASE ONLY	0	0			0		0		0	0
FUEL & COST SAVINGS CASES	3905	8300			7747427		50604768		-3415424	9031422
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	6082	0	0	-26160	7804	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	-26160	7804	2197
COST SAVINGS CASES ONLY	7194	-17	3642	0	0	-16071	7028	2130
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7194	-17	3642	0	0	-16071	7028	2130
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	-26160	7804	2197	4152
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	-26160	7804	2197	4152
COST SAVINGS CASES ONLY	7194	-17	3642	0	0	-16071	7028	2130	3905
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7194	-17	3642	0	0	-16071	7028	2130	3905
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	0	-552	2197	1645
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	-552	2197	1645
COST SAVINGS CASES ONLY	0	0	0	0	0	0	-476	2130	1654
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	-476	2130	1654
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E			EMISSIONS SAVINGS			01
NO.25 ADVANCED TECHNOLOGY, COMBINED CYCLE, DIRECT FIRED, COAL (PFB)										CAPITAL COST \$000	SAVINGS \$000	RATIO	PLANT UTILITY	SAVINGS PER YEAR	----- TOTAL	ECS SIZE (MW)
INDUSTRY	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL	UTILITY SAVINGS	COST RATIO	SAVINGS DOLLARS \$000										
NO.01 MEAT PACKING	0.153	16.0	48.0	0.018	6835	1525567	0.318	-23101	51337	28237	4.35*					
NO.02 BAKING	0.131	5.2	15.7	-0.319	-45593	732801	0.405	-7350	16786	9436	0.16*					
NO.03 MALT BEVERAGE	0.034	6.0	18.9	0.160	42238	646254	0.189	-9777	20256	10479	1.32*					
NO.04 WOVEN FABRIC MILL	0.189	20.4	77.8	-0.069	-35049	1961605	0.421	-40145	83275	43130	1.93*					
NO.05 SAW MILL	0.144	16.1	91.7	-0.836	-427520	6521471	0.402	-52911	98163	45252	0.20*					
NO.06 NEWSPRINT MILL	0.280	33.6	91.4	0.281	122615	836096	0.487	-39667	96292	56624	69.76					
NO.07 WRITING PAPER MILL	0.185	20.6	59.1	0.271	132752	880571	0.333	-31961	74301	42340	16.14					
NO.08 CORRUGATED PAPER	0.142	71.7	205.4	0.315	591256	2373917	0.285	-96372	218524	122151	45.04					
NO.09 BOX BOARD	0.164	25.4	72.5	0.302	173532	832633	0.323	-33425	76864	43440	38.57					
NO.10 CHLORINE	0.280	187.0	459.1	0.278	690908	4814805	0.483	-221456	540816	319362	45.16					
NO.11 ALUMINA	0.016	1.8	32.0	0.123	54578	434733	0.139	-22104	34273	12169	16.59					
NO.12 LOW DENS. POLYETHYL	0.098	17.0	148.6	0.037	55491	1685981	0.378	-92156	159056	66900	18.38					
NO.13 HI DENS. POLYETHYL	0.192	14.7	53.7	0.175	49124	709952	0.409	-27467	57565	30099	9.35*					
NO.14 POLYVINYL CHLORIDE	0.189	21.7	73.7	0.174	73538	1102197	0.391	-36634	78782	42147	6.69*					
NO.15 STYRENE-BUT. RUB.	0.077	1.5	4.2	0.164	11877	121544	0.155	-2210	4463	2253	1.47*					
NO.16 NYLON	0.214	6.2	20.7	0.128	13660	333526	0.430	-10123	22168	12045	3.88*					
NO.17 STYRENE	0.001	0.2	7.0	0.251	170160	296436	0.001	-7384	7532	148	3.31*					
NO.18 ETHYLENE	0.004	4.5	16.2	0.366	1486317	1445768	-0.016	-28984	16628	-12356	3.57*					
NO.19 PETROLEUM REFINING	0.040	162.6	293.3	0.361	5327661	7347623	0.053	-157236	313959	156722	21.68					
NO.20 TIRES	0.156	17.1	55.8	0.155	64448	1106063	0.330	-27582	59693	32111	6.97*					
NO.23 INTEGRATED STEEL	0.028	128.1	497.4	0.027	284997	7362097	0.057	-244447	521814	277367	99.83					
NO.24 GRAY IRON FOUNDRY	0.108	16.7	74.2	0.223	124515	987434	0.278	-41732	79390	37658	17.41					
NO.25 COPPER	0.158	25.3	82.6	0.189	111262	1421550	0.330	-41450	88446	46997	5.56*					
NO.26 MOTOR VEHICLE	0.137	28.7	93.8	0.110	83233	1716745	0.336	-46687	100465	53778	10.15					
TOTAL -- ALL										47197952	-1342358	2820843	1478437			
FUEL SAVINGS CASES ONLY										47197952	-1342358	2820843	1478437			
COST SAVINGS CASES ONLY										37982128	-1241953	2622620	1380669			
EMISSIONS SAVINGS CASE ONLY										0	0	0	0			
FUEL & COST SAVINGS CASES										37982128	-1241953	2622620	1380669			
FUEL, COST & EMISSION SAVING										0	0	0	0			

07

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.25 ADVANCED TECHNOLOGY, COMBINED CYCLE, DIRECT FIRED, COAL (PEB)

*** STRATEGY MATCH-E

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS 10**12 BTU		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		
	SAVINGS	10**12 BTU	SAVINGS	10**12 BTU	SAVINGS	DOLLARS \$000	COST	\$000	PLANT	UTILITY	TOTAL
TOTAL -- ALL	2821		9018		32225568		145173168		-4719911	9794866	5074939
FUEL SAVINGS CASES ONLY	2821		9018		32225568		145173168		-4719911	9794866	5074939
COST SAVINGS CASES ONLY	2741		8663		33199584		127508096		-4527454	9414908	4887439
EMISSIONS SAVINGS CASE ONLY	0		0		0		0		0	0	0
FUEL & COST SAVINGS CASES	2741		8663		33199584		127508096		-4527454	9414908	4887439
FUEL, COST & EMISSION SAVING	0		0		0		0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	COAL
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	-19687
COST SAVINGS CASES ONLY	14621	-425	6051	0	0	-19673
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14621	-425	6051	0	0	-19673
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

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INCLUDING COAL FUEL CONVERSION

TOTAL FUEL CONVERSION									
TOTAL	-- ALL								
FUEL SAVINGS CASES ONLY	14554	-425	6082	0	0	-19687	2197	2821	
COST SAVINGS CASES ONLY	14654	-425	6082	0	0	-19687	2197	2821	
EMISSIONS SAVINGS CASE ONLY	14621	-425	6051	0	0	-19673	2167	2741	
FUEL & COST SAVINGS CASES	14621	-425	6051	0	0	-19673	2167	2741	
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	

CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO. 26 ADVANCED TECHNOLOGY, CONTINUED CYCLE, INDIRECT FIRED, COAL (AFB)											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST SAVINGS		CAPITAL COST \$000		EMISSIONS SAVINGS		EMISSIONS SAVINGS		ECS SIZE (MW)
	SAVINGS RATIO	FUEL SAVINGS	FUEL SAVINGS RATIO	DOLLARS \$000	SAVINGS RATIO	\$000	SAVINGS RATIO	TONS PER YEAR	FLANT UTILITY TOTAL		
NO. 01 MEAT PACKING	0.169	17.7	48.0	0.019	7331	1594799	0.299	-24900	51337	26537	4.49*
NO. 02 BAYING	0.092	3.7	15.7	-0.358	-51147	765395	0.317	-9415	16786	7370	0.17*
NO. 03 MALT BEVERAGE	0.059	4.2	18.9	0.133	34959	694260	0.145	-12221	20256	8035	1.37*
NO. 04 KOVEN FABRIC MILL	-0.001	-0.1	77.8	-0.241	-95509	2168495	0.230	-59693	83275	23582	2.00*
NO. 05 SAW MILL	-0.090	-10.2	91.7	-0.961	-491644	6680285	0.184	-77398	98163	20765	0.20*
NO. 06 NEWSPRINT MILL	0.226	27.1	91.4	0.247	107806	901202	0.410	-48702	96292	47590	72.17
NO. 07 WRITING PAPER MILL	0.159	17.7	59.1	0.253	123909	944409	0.303	-38545	74301	35757	18.74
NO. 08 CORRUGATED PAPER	0.157	79.2	205.4	0.324	607465	2522288	0.269	-103213	218524	115311	47.25
NO. 09 BOX BOARD	0.181	28.0	72.5	0.312	179548	880919	0.305	-35838	76864	41026	39.77
NO. 10 CHLORINE	0.064	42.7	499.1	0.144	356808	5305612	0.281	-355168	540818	185650	46.87
NO. 11 ALUMINA	-0.010	-1.2	32.0	0.106	46945	468197	0.093	-26162	34273	8111	17.15
NO. 12 LOW DENS. POLYETHYL	-0.157	-27.3	148.6	-0.076	-48721	1858166	0.146	-133242	159056	25816	19.08
NO. 13 HI DENS. POLYETHYL	0.050	3.9	53.7	0.067	24323	757378	0.259	-38547	57565	19018	9.69*
NO. 14 POLYVINYL CHLORIDE	0.133	15.3	73.7	0.137	57808	1167746	0.307	-45710	78782	33071	6.92*
NO. 15 STYRENE-BUT. RUB.	0.056	1.1	4.2	0.145	10500	129879	0.119	-2741	4463	1722	1.51*
NO. 16 NYLON	0.034	1.0	20.7	0.010	1095	358679	0.250	-15155	22168	7012	4.03*
NO. 17 STYRENE	0.002	0.5	7.0	0.251	170411	309752	-0.001	-7593	7532	-61	3.39*
NO. 18 ETHYLENE	0.011	13.5	16.2	0.371	1504942	1480545	-0.009	-24124	16628	-7496	3.62*
NO. 19 PETROLEUM REFINING	0.048	195.0	293.3	0.365	5388318	7764397	0.054	-154001	313958	159957	22.29
NO. 20 TYRES	0.108	11.8	55.8	0.124	50189	1172657	0.256	-34742	59693	24951	7.21*
NO. 23 INTEGRATED STEEL	0.012	52.7	487.4	0.010	107419	7827476	0.042	-318307	521814	203507103.31	
NO. 24 GRAY IRON FOUNDRY	-0.041	-6.3	74.2	0.124	69170	1087937	0.122	-62893	79390	16497	18.08
NO. 25 COPPER	0.109	17.5	82.6	0.156	91717	1502462	0.255	-52072	88446	36375	5.75*
NO. 26 MOTOR VEHICLE	0.095	17.8	93.8	0.080	60852	1813035	0.260	-58746	100465	41719	10.49
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TOTAL -- ALL		507	2623		8314494	50155872		-1739026	2620843	1081821	
FUEL SAVINGS CASES ONLY		552	2199		8334250	37592832		-1379639	2366687	987052	
COST SAVINGS CASES ONLY		541	2239		9001509	38683568		-1459278	2463564	1004290	
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0	
FUEL & COST SAVINGS CASES		549	2183		8895395	37127440		-1370223	2349901	979682	
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0	0	0	

YEAR : 1990
 NO.26 ADVANCED TECHNOLOGY, COMBINED CYCLE, INDIRECT FIRED, COAL (AFB) *** STRATEGY MATCH-E
 NATIONAL SUMMARY

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TONS PER YEAR
TOTAL -- ALL	1848	9018			29801856	154547696			-5952309	9,74666
FUEL SAVINGS CASES ONLY	2023	7477			30551536	121374512			-4632808	8145838
COST SAVINGS CASES ONLY	1997	7921			31268560	126843940			-5006382	6620948
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0
FUEL & COST SAVINGS CASES	2021	7447			30249568	119907440			-4614759	8113663
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	COAL	OTHER
	14054	-425	6082	0	-20661	2197
	14060	-17	5633	0	-19737	2089
	14554	-425	6028	0	-20314	2154
	14060	0	0	0	0	0
	14060	-17	5628	0	-19726	2076
	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14054	-425	6082	0	-20661	2197	1848
FUEL SAVINGS CASES ONLY	14060	-17	5633	0	-19737	2089	2028
COST SAVINGS CASES ONLY	14554	-425	6028	0	-20314	2154	1997
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14060	-17	5628	0	-19726	2076	2021
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION							
TOTAL -- ALL	14054	-425	6082	0	-20661	2197	1848
FUEL SAVINGS CASES ONLY	14060	-17	5633	0	-19737	2089	2028
COST SAVINGS CASES ONLY	14554	-425	6028	0	-20314	2154	1997
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14060	-17	5628	0	-19726	2076	2021
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E				EMISSIONS SAVINGS		01	
NO. 27 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP., PETROLEUM DISTILLATE										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT UTILITY		TOTAL	
INDUSTRY	FUEL SAVINGS RATIO	ENERGY TOTAL	UTILITY FUEL SAVINGS	COST DOLLARS \$000	SAVINGS	SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO
NO. 01 MEAT PACKING	0.293	30.8	49.0	0.051	20039	495495	0.775	14445	51337	65782	4.29						
NO. 02 BAKING	0.133	5.3	15.7	-0.143	-20424	130750	0.825	1877	16786	18663	0.16*						
NO. 03 MALT BEVERAGE	0.074	5.3	10.9	-0.063	-16468	184083	0.408	916	20256	21172	1.31						
NO. 04 WOVEN FABRIC MILL	0.139	15.0	77.8	-0.178	-70700	531319	0.851	2248	83274	85522	1.91						
NO. 05 SAW MILL	0.292	32.8	91.7	-0.059	-30249	1515035	0.994	12350	98163	110513	0.20*						
NO. 06 NEWSPRINT MILL	0.215	25.8	91.4	-0.072	-31208	433779	0.912	7822	96292	104113	69.19						
NO. 07 WRITING PAPER MILL	0.168	18.7	59.1	-0.037	-18255	420950	0.717	7055	74301	81356	18.01						
NO. 08 CORRUGATED PAPER	0.174	88.2	205.4	0.014	25664	1312276	0.617	33077	218524	251550	45.45						
NO. 09 BOX BOARD	0.191	29.6	72.5	0.009	5322	449785	0.684	11067	76864	87931	38.24						
NO. 10 CHLORINE	0.235	157.2	499.1	-0.052	-130040	2421524	0.916	53610	540818	594428	44.79						
NO. 11 ALUMINA	0.002	0.2	32.0	-0.107	-47367	207177	0.359	-3888	34273	30386	16.48						
NO. 12 LOW DENS. POLYETHYL	0.151	26.4	148.6	-0.100	-114899	731404	0.925	3187	159056	162244	18.19						
NO. 13 HI DENS. POLYETHYL	0.145	11.1	53.7	-0.135	-37870	286301	0.827	1875	57565	59441	9.28						
NO. 14 POLYVINYL CHLORIDE	0.148	17.1	73.7	-0.110	-46317	410389	0.705	3592	78782	82373	6.64						
NO. 15 STYRENE-BUT. RUB.	0.068	1.3	4.2	-0.043	-3095	37243	0.336	144	4463	4607	1.46						
NO. 16 NYLON	0.165	4.8	20.7	-0.114	-12143	108138	0.849	1099	22168	23267	3.85						
NO. 17 STYRENE	0.012	2.2	7.0	-0.067	-45506	170614	0.059	-1562	7532	5970	3.38						
NO. 18 ETHYLENE	0.025	28.8	16.2	-0.008	-31235	447551	0.021	-1331	16628	15297	2.83						
NO. 19 PETROLEUM REFINING	0.039	157.4	293.3	-0.013	-198929	2578989	0.121	14056	313958	328014	19.19						
NO. 20 TIRES	0.129	14.1	55.8	-0.037	-39422	424223	0.672	3211	59693	62904	6.92						
NO. 23 INTEGRATED STEEL	0.020	89.2	487.4	-0.029	-311435	4973788	0.107	-3103	521814	518712	99.08						
NO. 24 GRAY IRON FOUNDRY	0.083	12.9	74.2	-0.129	-72049	410903	0.611	0	79390	79391	17.21						
NO. 25 COPPER	0.130	20.9	82.6	-0.089	-52459	518271	0.677	4274	88446	92720	5.52						
NO. 26 MOTOR VEHICLE	0.113	23.7	93.8	-0.131	-99980	719290	0.686	5167	100465	105632	10.07						
TOTAL -- ALL		819	2623		-1378022	19919232		171138	2820843	2991980							
FUEL SAVINGS CASES ONLY		819	2623		-1378022	19919232		171138	2820843	2991980							
COST SAVINGS CASES ONLY		149	366		51026	2257555		58539	346725	405264							
EMISSIONS SAVINGS CASE ONLY		698	2080		-942480	14120140		181022	2240598	2421619							
FUEL & COST SAVINGS CASES		149	366		51026	2257555		58539	346725	405264							
FUEL, COST & EMISSIONS SAVING		149	366		51026	2257555		58539	346725	405264							

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E			EMISSIONS SAVINGS			01
NO.29 ADVANCED TECHNOLOGY,FUEL CELL,LOW TEMP.,COAL DERIVED DIST										CAPITAL COST \$000	SAVINGS RATIO	PLANT	UTILITY	YEAR	----- TOTAL	ECS SIZE (MM)
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COAL SAVINGS RATIO	DOLLARS \$000	COST \$000	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	
NO.01 MEAT PACKING	0.313	32.8	48.0	0.018	7001	634714	0.651	6360	51337	57698	4.28					
NO.02 BAKING	0.246	9.8	15.7	-0.062	-8879	159274	0.791	1625	16786	18411	0.16*					
NO.03 MALT BEVERAGE	0.167	11.9	18.9	0.009	2249	215203	0.388	1325	20256	21581	1.30					
NO.04 WOVEN FABRIC MILL	0.136	14.6	77.8	-0.239	-94226	699525	0.626	-19081	83275	64213	1.91					
NO.05 SAW MILL	0.291	32.6	91.7	-0.128	-65289	1792019	0.771	-11270	98163	86893	9.20*					
NO.06 NEWSRINT MILL	0.267	32.0	91.4	-0.076	-32948	551096	0.759	-8057	96292	88234	68.92					
NO.07 WRITING PAPER MILL	0.356	39.7	59.1	0.112	54932	504021	0.708	9186	74301	83487	17.84					
NO.08 CORRUGATED PAPER	0.270	136.4	205.4	0.080	149858	1556806	0.564	23317	218524	241841	45.15					
NO.09 BOX BOARD	0.310	48.1	72.5	0.094	54160	536911	0.635	8590	76864	85454	37.97					
NO.10 CHLORINE	0.234	156.8	499.1	-0.111	-275794	3140389	0.728	-59353	540818	481466	44.71					
NO.11 ALUMINA	0.053	5.8	32.0	-0.081	-35743	253629	0.303	-7759	34273	26515	16.39					
NO.12 LOW DENS. POLYETHYL	0.151	26.4	148.6	-0.232	-148559	968164	0.688	-37118	159056	121938	18.19					
NO.13 HI DENS. POLYETHYL	0.137	10.4	53.7	-0.200	-56273	370613	0.633	-11008	57565	46557	9.27					
NO.14 POLYVINYL CHLORIDE	0.141	16.2	73.7	-0.170	-71878	529551	0.601	-13913	78782	64868	6.63					
NO.15 STYRENE-BUT. RUB.	0.145	2.7	4.2	0.016	1158	42989	0.323	226	4463	4689	1.45					
NO.16 NYLON	0.155	4.5	20.7	-0.183	-19460	140797	0.654	-3955	22168	18312	3.85					
NO.17 STYRENE	0.013	2.5	7.0	-0.069	-46650	183342	0.039	-3161	7532	4371	3.37					
NO.18 ETHYLENE	0.029	34.2	16.2	-0.004	-17736	476434	0.018	-2026	16628	14602	2.82					
NO.19 PETROLEUM REFINING	0.064	262.0	293.3	0.007	102266	3008386	0.112	20774	313958	334732	19.05					
NO.20 TIRES	0.150	16.4	55.8	-0.125	-50545	539816	0.532	-7890	59693	51802	6.90					
NO.23 INTEGRATED STEEL	0.019	85.0	487.4	-0.041	-441940	5781080	0.081	-126624	521814	395191	98.90					
NO.24 GRAY IRON FOUNDRY	0.083	12.9	74.2	-0.162	-90367	543963	0.435	-20362	79390	59029	17.21					
NO.25 COPPER	0.149	23.9	82.6	-0.115	-67350	660799	0.533	-12490	88446	75956	5.50					
NO.26 MOTOR VEHICLE	0.128	26.6	93.8	-0.160	-121207	917454	0.539	-14160	100465	86305	10.05					
TOTAL -- ALL										24206928	-286705	2820843	2534138			
FUEL SAVINGS CASES ONLY										24206928	-286705	2820843	2534138			
COST SAVINGS CASES ONLY										69777	759704	829482				
EMISSIONS SAVINGS CASE ONLY										71402	776490	847892				
FUEL & COST SAVINGS CASES										69777	759704	829482				
FUEL, COST & EMISSIONS SAVING										69777	759704	829482				

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO.28 ADVANCED TECHNOLOGY,FUEL CELL,LOW TEMP,COAL DERIVED DIST
07

*** STRATEGY MATCH-E

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS 10**12 BTU		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	SAVINGS	10**12 BTU	SAVINGS	10**12 BTU	SAVINGS	DOLLARS \$000	COST	\$000	PLANT	UTILITY
TOTAL -- ALL	3305		9018		-3165039		76912112		-763946	9794864
FUEL SAVINGS CASES ONLY	3605		9018		-3165039		76912112		-763946	9794864
COST SAVINGS CASES ONLY	1945		2724		1869458		23651600		322552	3072091
EMISSIONS SAVINGS CASE ONLY	1944		2754		1852439		23956896		325667	3104266
FUEL & COST SAVINGS CASES	1945		2724		1869458		23651600		322552	3072091
FUEL,COST & EMISSION SAVING	1945		2724		1869458		23651600		322552	3072091

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	OTHER
TOTAL -- ALL	14654	-425	6082	0	-8433	-18074
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-8433	-18074
COST SAVINGS CASES ONLY	4912	-17	2695	0	-2613	-8035
EMISSIONS SAVINGS CASE ONLY	4912	-17	2700	0	-2642	-8035
FUEL & COST SAVINGS CASES	4912	-17	2695	0	-2613	-8035
FUEL,COST & EMISSION SAVING	4912	-17	2695	0	-2613	-8035

SITE PLUS UTILITY

TOTAL -- ALL	3805		2197		7804		2197		3805
FUEL SAVINGS CASES ONLY	3805		2197		7804		2197		3805
COST SAVINGS CASES ONLY	1945		1335		3668		1335		1945
EMISSIONS SAVINGS CASE ONLY	1964		1348		3698		1348		1964
FUEL & COST SAVINGS CASES	1945		1335		3668		1335		1945
FUEL,COST & EMISSION SAVING	1945		1335		3668		1335		1945

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	1150		2197		-1047		2197		1150
FUEL SAVINGS CASES ONLY	1150		2197		-1047		2197		1150
COST SAVINGS CASES ONLY	635		1335		-700		1335		635
EMISSIONS SAVINGS CASE ONLY	644		1348		-704		1348		644
FUEL & COST SAVINGS CASES	635		1335		-700		1335		635
FUEL,COST & EMISSION SAVING	635		1335		-700		1335		635

CTAS GENERAL SUMMARY - PROCESS LEVEL																			
NO.29 ADVANCED TECHNOLOGY,FUEL CELL,HIGH TEMP.,PETROLEUM DIST.																			
INDUSTRY	FUEL ENERGY TOTAL			UTILITY			SAVINGS			CAPITAL COST			EMISSIONS MATCH-E			EMISSIONS SAVINGS			ECS SIZE (MM)
	SAVINGS	FUEL	TOTAL	SAVINGS	FUEL	TOTAL	RATIO	COST	DOLLARS \$000	RATIO	SAVINGS \$000	SAVINGS \$000	RATIO	PLANT	UTILITY	YEAR	TOTAL		
NO.01 MEAT PACKING	0.310		32.5	48.0	0.044				16949		561923	0.651		3909	51337		55246	4.28	
NO.02 BAKING	0.156		6.2	15.7	-0.126				-17990		152379	0.636		-2405	16786		14381	0.16*	
NO.03 MALT BEVERAGE	0.105		7.4	18.9	-0.033				-8638		202537	0.322		-3542	20256		16715	1.31	
NO.04 MOVEN FABRIC MILL	0.264		23.4	77.8	-0.055				-21706		603323	0.697		-13230	83274		70045	1.91	
NO.05 SAW MILL	0.428		48.0	91.7	0.037				18095		1659045	0.829		-6076	98163		92087	0.20*	
NO.06 NEWSPRINT MILL	0.309		37.1	91.4	0.026				11414		494160	0.731		-12837	96292		83455	69.26	
NO.07 WRITING PAPER MILL	0.234		26.0	59.1	0.029				14098		472259	0.577		-8853	74301		65448	18.03	
NO.08 CORRUGATED PAPER	0.224		113.4	205.4	0.065				121690		1449752	0.503		-13627	218524		204896	45.49	
NO.09 BOX BOARD	0.249		38.5	72.5	0.068				38065		501388	0.556		-5355	76864		71510	38.28	
NO.10 CHLORINE	0.327		218.8	499.1	0.044				109138		2765428	0.737		-62542	540819		478276	44.83	
NO.11 ALUMINA	0.037		4.1	32.0	-0.074				-32731		232253	0.273		-11166	34273		23108	16.49	
NO.12 LOW DENS. POLYETHYL	0.311		54.3	146.6	-0.014				-8813		831325	0.765		-24879	159056		134178	18.18	
NO.13 HI DENS. POLYETHYL	0.259		19.8	53.7	-0.017				-4791		326140	0.674		-9134	57565		48431	9.28	
NO.14 POLYVINYL CHLORIDE	0.237		27.3	73.7	-0.019				-7999		466952	0.631		-12600	78782		66181	6.65	
NO.15 STYRENE-BUT. RUB.	0.093		1.8	4.2	-0.018				-1323		40817	0.264		-836	4463		3628	1.46	
NO.16 NYLON	0.263		7.6	20.7	-0.015				-1568		124740	0.692		-3488	22168		18680	3.86	
NO.17 STYRENE	0.013		2.5	7.0	-0.067				-45615		176655	0.044		-3108	7532		4424	3.38	
NO.18 ETHYLENE	0.026		31.0	16.2	-0.006				-23272		462866	0.015		-5528	16628		11100	2.83	
NO.19 PETROLEUM REFINING	0.047		194.1	293.3	-0.004				-62159		2820023	0.096		-54185	313958		259773	19.21	
NO.20 TIRES	0.192		21.0	55.8	-0.037				-15168		483027	0.535		-9597	59693		50096	6.93	
NO.23 INTEGRATED STEEL	0.036		164.1	497.4	-0.003				-32494		5314424	0.088		-92784	521814		429830	99.09	
NO.24 GRAY IRON FOUNDRY	0.164		25.4	74.2	-0.045				-25185		459677	0.496		-14980	79390		64411	17.21	
NO.25 COPPER	0.194		31.1	82.6	-0.026				-15007		591104	0.539		-14725	88446		73722	5.52	
NO.26 MOTOR VEHICLE	0.169		35.2	93.8	-0.077				-58149		818254	0.546		-16398	100465		84067	10.08	

TOTAL -- ALL			1176	2623					-51360		22022400			-397962	2320834		2422880		
FUEL SAVINGS CASES ONLY			1176	2623					-51360		22022400			-397962	2320834		2422880		
COST SAVINGS CASES ONLY			514	1067					331250		7983954			-105380	1156299		1050919		
EMISSIONS SAVINGS CASE ONLY			33	48					16949		561923			3909	51337		55246		
FUEL & COST SAVINGS CASES			514	1067					331250		7983954			-105380	1156299		1050919		
FUEL,COST & EMISSION SAVING			33	48					16949		561923			3909	51337		55246		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.29 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP., PETROLEUM DIST.

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	4015	9018			61547		7008240		-1387988	9794866
FUEL SAVINGS CASES ONLY	4015	9018			61547		7008240		-1387988	9794866
COST SAVINGS CASES ONLY	2206	4763			1350326		32813120		-544723	5245374
EMISSIONS SAVINGS CASE ONLY	62	92			32408		1077100		7493	98404
FUEL & COST SAVINGS CASES	2206	4763			1350326		32813120		-544723	5245374
FUEL, COST & EMISSION SAVING	62	92			32408		1077100		7493	98404

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS		DISTILLATE		PETROLEUM		BOILER FUEL		GAS		DISTILLATE		BOILER FUEL		COAL		OTHER		TOTAL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
TOTAL -- ALL	14654	-6730	-13910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL SAVINGS CASES ONLY	14654	-6730	-13910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	1321	-3353	-1396	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	61	-81	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1321	-3353	-1396	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	61	-81	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-6730	-13910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL SAVINGS CASES ONLY	14654	-6730	-13910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	1321	-3353	-1396	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	61	-81	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1321	-3353	-1396	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	61	-81	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E				EMISSIONS SAVINGS		ECS	
NO.30 ADVANCED TECHNOLOGY FUEL CELL, HIGH TEMP, COAL DER. DIST.										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT		TOTAL	
INDUSTRY										FUEL ENERGY TOTAL FUEL SAVINGS RATIO		UTILITY FUEL SAVINGS RATIO		TOHS PER YEAR		SIZE (MM)	
										DOLLARS \$000		DOLLARS \$000		UTILITY		TOTAL	
NO.01 HEAT PACKING	0.311	32.6	48.0	0.066	25742	495062	0.622	3777	51337	55114	4.28						
NO.02 BAKING	0.223	8.9	15.7	-0.048	-6809	123218	0.726	174	16786	16960	0.16*						
NO.03 MALT BEVERAGE	0.154	11.0	18.9	0.019	4877	178003	0.360	-281	20256	19975	1.31						
NO.04 WOVEN FABRIC MILL	0.337	36.3	77.8	0.025	9993	495875	0.768	-4535	83274	78739	1.90						
NO.05 SAW MILL	0.428	48.0	91.7	0.068	34784	1532014	0.803	-7751	98163	90412	0.20*						
NO.06 NEWSPRINT MILL	0.329	39.4	91.4	0.046	20329	401891	0.764	-7493	96292	88798	68.68						
NO.07 WRITING PAPER MILL	0.344	38.3	59.1	0.138	67397	399522	0.669	4533	74301	78834	17.88						
NO.08 CORRUGATED PAPER	0.264	133.6	205.4	0.103	192932	1261924	0.535	11118	218524	229641	45.23						
NO.09 DOX BOARD	0.303	47.0	72.5	0.120	68961	433022	0.603	4224	76864	81088	38.04						
NO.10 CHLORINE	0.413	276.2	499.1	0.145	359740	2275723	0.792	-16981	540818	523839	44.55						
NO.11 ALUMINA	0.097	10.7	32.0	-0.018	-8094	196703	0.325	-5854	34273	28419	16.36						
NO.12 LOW DENS. POLYETHYL	0.280	40.8	148.6	-0.021	-13577	729362	0.710	-33291	159056	125765	18.19						
NO.13 HI DENS. POLYETHYL	0.379	29.0	53.7	0.106	29863	260700	0.777	-472	57565	57093	9.21						
NO.14 POLYVINYL CHLORIDE	0.371	42.7	73.7	0.119	50378	375934	0.742	1282	78782	80064	6.59						
NO.15 STYRENE-BUT. RUB.	0.135	2.5	4.2	0.022	1626	35975	0.299	-123	4463	4340	1.45						
NO.16 NYLON	0.368	10.6	20.7	0.093	9901	100603	0.774	-490	22168	21678	3.83						
NO.17 STAPERE	0.013	2.5	7.0	-0.066	-46667	170953	0.036	-3536	7532	3996	3.38						
NO.18 ETHYLENE	0.009	33.9	16.2	-0.003	-13480	446231	0.017	-3117	16628	13510	2.82						
NO.19 PETROLEUM REFINING	0.063	255.9	293.3	0.011	168173	2486440	0.106	1301	313958	315259	19.06						
NO.20 TILES	0.293	32.6	55.8	0.075	30231	402067	0.622	904	59693	60596	6.87						
NO.23 INTEGRATED STEEL	0.059	268.7	487.4	0.049	519342	4749966	0.092	-71946	521614	449868	98.23						
NO.24 GRAY IRON FOUNDRY	0.224	34.7	74.2	0.012	6653	405119	0.545	-5499	79390	73892	17.20						
NO.25 COPPER	0.302	49.4	82.6	0.085	50134	490743	0.626	795	88446	89241	5.48						
NO.26 MOTOR VEHICLE	0.263	54.8	93.8	0.025	18747	678091	0.635	1255	100465	101720	10.00						
TOTAL - ALL		1547	2623		158347	19125966		-132007	2820843	2688830							
FUEL SAVINGS CASES ONLY		1547	2623		158347	19125966		-132007	2820843	2688830							
COST SAVINGS CASES ONLY		1442	2403		1669972	17459520		-86393	2506570	2500138							
EMISSIONS SAVINGS CASE ONLY		695	1000		665937	7146870		29362	1079156	1108518							
FUEL & COST SAVINGS CASES		1442	2403		1669972	17459520		-86393	2506570	2500180							
FUEL, COST & EMISSIONS SAVINGS		1886	934		672746	7023551		29168	1062370	1091558							

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

07

YEAR : 1990 NO. 30 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP, COAL DER. DIST.	*** STRATEGY MATCH-E				
	TOTAL FUEL SAVINGS		EMISSIONS SAVINGS		TOTAL
	10**12 BTU	10**12 BTU	PLANT UTILITY	TONS PER YEAR	
CATEGORY	SAVINGS	COST \$000	SAVINGS \$000	EMISSIONS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	
TOTAL -- ALL	5137	9010	4874926	60410496	9358771
FUEL SAVINGS CASES ONLY	5137	9018	4874926	60410496	9358771
COST SAVINGS CASES ONLY	4506	7770	5296666	50602280	8290320
EMISSIONS SAVINGS CASE ONLY	2366	3536	2685704	23685136	4092875
FUEL & COST SAVINGS CASES	4506	7770	5296666	50602280	8290320
FUEL, COST & EMISSION SAVING	2348	3506	2685755	23648944	4060366

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				
	NATURAL PETROLEUM		COAL DERIVED		TOTAL
	GAS	DISTILLATE	PETROLEUM	BOILER FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	
TOTAL -- ALL	14654	-425	6082	-17899	5137
FUEL SAVINGS CASES ONLY	14654	-425	6082	-17899	5137
COST SAVINGS CASES ONLY	7196	-17	3656	-8653	4506
EMISSIONS SAVINGS CASE ONLY	5179	0	2772	-8430	2366
FUEL & COST SAVINGS CASES	7196	-17	3656	-8653	4506
FUEL, COST & EMISSION SAVING	5179	0	2767	-8426	2348
INCLUDING COAL FUEL CONVERSION					
TOTAL -- ALL	0	0	0	0	3052
FUEL SAVINGS CASES ONLY	0	0	0	0	3052
COST SAVINGS CASES ONLY	0	0	0	0	2745
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	823
FUEL & COST SAVINGS CASES	0	0	0	0	2745
FUEL, COST & EMISSION SAVING	0	0	0	0	817

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-E			EMISSIONS SAVINGS			01 ECS SIZE (MM)
NO.31 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP., COAL GASIFIER										CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	SAVINGS DOLLARS \$000	---- TONS PER YEAR ----		TOTAL	
INDUSTRY	FUEL SAVINGS PATIO	ENERGY TOTAL	FUEL SAVINGS	UTILITY SAVINGS	COAL TEMP.	CELL, HIGH	TEMP., COAL	GASIFIER COST DOLLARS \$000	SAVINGS DOLLARS \$000				PLANT	UTILITY		
NO.01 MEAT PACKING	0.262	27.5	48.0	-0.053	-20494					1927275	0.765	16459	51337	67796	4.28*	
NO.02 BAKING	0.166	6.6	15.7	-0.238	-34045					689028	0.888	3889	16786	20674	0.16*	
NO.03 MALT BEVERAGE	0.106	7.5	18.9	-0.037	-9667					654337	0.431	3712	20256	23968	1.31*	
NO.04 WOVEN FABRIC MILL	0.144	15.5	77.8	-0.170	-67235					2382274	0.882	7105	83274	90380	1.90*	
NO.05 SAW MILL	0.065	7.3	91.7	-0.528	-270145					5156875	0.874	233	98163	98396	0.20*	
NO.06 NEWSPRINT MILL	0.378	45.4	91.4	0.302	131881					1217676	0.914	9959	96292	106251	63.65	
NO.07 WRITING PAPER MILL	0.236	26.2	59.1	0.202	98819					1238342	0.782	17881	74301	92182	17.87	
NO.08 CORRUGATED PAPER	0.226	114.1	205.4	0.220	413526					3265817	0.663	66150	218524	284674	45.11	
NO.09 BOX BOARD	0.250	38.8	72.5	0.243	139999					1156300	0.740	22669	76864	99533	37.95	
NO.10 CHLORINE	0.214	143.1	499.1	0.189	469068					7323689	0.891	48240	540818	589058	44.59	
NO.11 ALUMINA	0.038	4.3	32.0	0.007	3231					610688	0.395	252	34273	34526	16.35*	
NO.12 LOW DENS. POLYETHYL	0.015	2.7	148.6	-0.034	-21442					2512443	0.869	-5135	159056	153921	18.15	
NO.13 HI DENS. POLYETHYL	0.192	14.6	53.7	0.117	32937					1004804	0.886	7562	57565	65128	9.22*	
NO.14 POLYVINYL CHLORIDE	0.227	26.2	73.7	0.132	55797					1492982	0.864	14459	78782	93240	6.59*	
NO.15 STYRENE-BUT. RUB.	0.095	1.8	4.2	0.000	-31					125149	0.359	749	4463	5213	1.45*	
NO.16 NYLON	0.177	5.1	20.7	0.057	6106					436444	0.885	2605	22168	24773	3.83*	
NO.17 STYRENE	0.099	1.7	7.0	-0.064	-43559					301998	0.052	-1684	7532	5848	3.37*	
NO.18 ETHYLENE	0.026	31.0	16.2	-0.003	-12402					770142	0.322	1045	16628	17673	2.82*	
NO.19 PETROLEUM REFINING	0.048	195.0	293.3	0.018	267505					6437625	0.125	58573	313958	372531	19.05	
NO.20 TIRES	0.194	21.2	55.8	0.036	14489					1483960	0.732	11650	59692	71342	6.87*	
NO.23 INTEGRATED STEEL	0.033	150.3	407.4	0.023	249648					9484124	0.090	-44271	521814	477543	98.31	
NO.24 GRAY IRON FOUNDRY	-0.055	-8.6	74.2	-0.132	-73822					1438128	0.504	-11100	79390	62291	17.22	
NO.25 COPPER	0.196	31.4	62.6	0.094	49124					1873997	0.738	16735	88446	105181	5.47*	
NO.26 MOTOR VEHICLE	0.171	35.6	93.8	0.005	3696					2366345	0.748	19348	108465	119813	9.99*	
TOTAL -- ALL										55372289		267085	2820643	3087929		
FUEL SAVINGS CASES ONLY										53934160		278185	2741453	3019639		
COST SAVINGS CASES ONLY										39412720		251812	2283960	2535771		
EMISSIONS SAVINGS CASE ONLY										41635632		359274	2053052	2382327		
FUEL & COST SAVINGS CASES										39412720		251812	2283960	2535771		
FUEL, COST & EMISSIONS SAVING										29928803		256093	1762146	2058228		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 31 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP., COAL GASIFIER

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		
	SAVINGS	10**12 BTU	SAVINGS	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	UTILITY	TOTAL
TOTAL -- ALL	3478		9018		7101834		176607632		1167717	9794862	10942580
FUEL SAVINGS CASES ONLY	3494		8376		7243339		173851024		1168993	9642697	10811681
COST SAVINGS CASES ONLY	3114		7486		8365464		133231376		1129024	8160601	9289626
EMISSIONS SAVINGS CASE ONLY	3187		7175		7025606		142064416		1285427	7821922	9107349
FUEL & COST SAVINGS CASES	3114		7486		8365464		133231376		1129024	8160601	9289626
FUEL,COST & EMISSION SAVING	2826		6552		7806936		115052144		1213894	7160383	8374266

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS NATURAL PETROLEUM		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	GAS	DISTILLATE	PETROLEUM	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL

SITE PLUS UTILITY	TOTAL -- ALL	14654	-425	6082	0	0	-17462	-1569	2197	3478
	FUEL SAVINGS CASES ONLY	14593	-425	6078	0	0	-17314	-1548	2119	3494
	COST SAVINGS CASES ONLY	7350	-408	3975	0	0	-6385	-1438	2019	3114
	EMISSIONS SAVINGS CASE ONLY	12762	-425	5331	0	0	-16802	896	1424	3187
	FUEL & COST SAVINGS CASES	7350	-408	3975	0	0	-6385	-1438	2019	3114
INCLUDING COAL FUEL CONVERSION	FUEL, COST & EMISSION SAVING	5895	-403	3401	0	0	-6385	965	1368	2826
	TOTAL -- ALL	1894	0	867	0	0	0	-1442	2197	3516
	FUEL SAVINGS CASES ONLY	1894	0	867	0	0	0	-1317	2119	3563
	COST SAVINGS CASES ONLY	1809	0	826	0	0	0	-1585	2019	3070
	EMISSIONS SAVINGS CASE ONLY	361	0	270	0	0	0	1233	1424	3288
	FUEL & COST SAVINGS CASES	1809	0	826	0	0	0	-1585	2019	3070
	FUEL, COST & EMISSION SAVING	343	0	253	0	0	0	818	1368	2762

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CIAS GENERAL SUMMARY - PROCESS LEVEL											
INDUSTRY	NO. 32 ADVANCED TECHNOLOGY, STEEL ENGINE, COAL DERIVED BOILER GRADE	FUEL ENERGY TOTAL		UTILITY FULL		COST SAVINGS		*** STRATEGY MATCH-E		EMISSIONS SAVINGS	
		SAVINGS RATIO	SAVINGS	FUEL	SAVINGS	RATIO	DOLLARS \$000	CAPITAL SAVINGS \$000	EMISSIONS RATIO	PLANT UTILITY	SAVINGS TOTAL

NO. 01 MEAT PACKING	0.249	26.1	48.0	-0.006	-2347	755453	0.306	-16902	51337	34435	4.36
NO. 02 BAKING	0.092	3.7	15.7	-0.252	-35922	293172	0.341	-8844	16766	7942	0.16*
NO. 03 MALT BEVERAGE	0.076	5.4	18.9	-0.064	-16730	279254	0.174	-10600	20256	9656	1.34
NO. 04 WOVEN FABRIC MILL	0.198	21.3	77.8	-0.125	-49440	906054	0.410	-41226	83275	42048	1.96
NO. 05 SAW MILL	0.334	37.5	91.7	-0.140	-71678	2500435	0.520	-39547	98163	58617	0.20*
NO. 06 NEWSPRINT MILL	0.256	30.8	91.4	0.017	7252	643655	0.454	-43517	96292	52775	28.28
NO. 07 WRITING PAPER MILL	0.193	22.0	59.1	0.026	12628	575106	0.357	-32282	74301	42019	18.37
NO. 08 CORRUGATED PAPER	0.198	100.2	205.4	0.056	105405	1878337	0.322	-80510	218524	138014	23.10
NO. 09 BOX BOARD	0.218	33.8	72.5	0.060	39223	596263	0.356	-28987	76864	47877	25.93
NO. 10 CHLORINE	0.275	183.8	499.1	0.014	35440	4034366	0.464	-234277	540810	306541	22.91
NO. 11 ALUMINA	0.018	1.9	32.0	-0.078	-34333	286370	0.132	-22725	34273	11549	16.84
NO. 12 LOW DENS. POLYETHYL	0.252	43.9	148.6	-0.025	-15976	1074232	0.468	-76157	159056	82899	18.58
NO. 13 HI DENS. POLYETHYL	0.211	16.1	53.7	-0.030	-8383	426430	0.407	-27656	57565	29909	9.49
NO. 14 POLYVINYL CHLORIDE	0.193	22.2	73.7	-0.034	-14579	623108	0.379	-37951	78782	40830	6.79
NO. 15 STYRENE-CUT. RUB.	0.073	1.4	4.2	-0.036	-2591	54634	0.145	-2360	4463	2104	1.49
NO. 16 NYLON	0.208	6.0	20.7	-0.043	-4583	173974	0.408	-10730	22168	11438	3.94
NO. 17 STYRENE	0.009	1.6	7.0	-0.068	-45918	186357	0.009	-6506	7532	1025	3.42
NO. 18 ETHYLENE	0.025	29.8	16.2	-0.005	-22231	488315	0.006	-11957	16628	4671	2.87
NO. 19 PETROLEUM REFINING	0.043	174.1	293.3	-0.005	-72056	3292499	0.053	-156522	313950	157436	19.59
NO. 20 TIRES	0.157	17.1	55.8	-0.058	-23503	629433	0.317	-28782	59693	30910	7.00
NO. 23 INTEGRATED STEEL	0.029	130.8	487.4	-0.010	-109297	6410362	0.056	-249999	521814	271816	28.93
NO. 24 GRAY IRON FOUNDRY	0.107	16.6	74.2	-0.082	-45585	623027	0.264	-43532	79390	35859	17.68
NO. 25 COPPER	0.158	25.3	82.6	-0.043	-25296	788125	0.317	-43333	88446	45113	5.64
NO. 26 MOTOR VEHICLE	0.138	28.8	93.8	-0.094	-71160	1052701	0.323	-48730	100465	51735	10.30

TOTAL -- ALL		930	2623		-471661	28563616		-1303631	2820344	1517214	
FUEL SAVINGS CASES ONLY		930	2623		-471661	28563616		-1303631	2820344	1517214	
COST SAVING CASES ONLY		371	928		199948	7727746		-419573	1006799	587226	
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0	
FUEL & COST SAVINGS CASES		371	928		199948	7727746		-419573	1006799	587226	
FUEL-COST & EMISSION SAVING		0	0		0	0		0	0	0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 32 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL DERIVED BOILER GRADE

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
---	---	---	---	---	---	---	---
TOTAL -- ALL	3366	9010	-948133	89695240	-4527722	9794066	5267120
FUEL SAVINGS CASES ONLY	3366	9010	-948133	89695240	-4527722	9794066	5267120
COST SAVINGS CASES ONLY	1746	4495	966222	37299744	-2100803	4956011	2857929
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1746	4495	966222	37299744	-2100803	4956011	2857929
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU					TOTAL	
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	COAL DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
---	---	---	---	---	---	---	---
TOTAL -- ALL	14654	-425	6002	0	0	7804	2197
FUEL SAVINGS CASES ONLY	14654	-425	6002	0	0	7804	2197
COST SAVINGS CASES ONLY	1245	0	1075	0	0	5324	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1245	0	1075	0	0	5324	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6002	0	0	7804	2197	3366
FUEL SAVINGS CASES ONLY	14654	-425	6002	0	0	7804	2197	3366
COST SAVINGS CASES ONLY	1245	0	1075	0	0	5324	0	1746
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1245	0	1075	0	0	5324	0	1746
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	-1674	2197	523
FUEL SAVINGS CASES ONLY	0	0	0	0	0	-1674	2197	523
COST SAVINGS CASES ONLY	0	0	0	0	0	212	0	212
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	212	0	212
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

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INDUSTRY	CTAS GENERAL SUMMARY - PROCESS LEVEL				*** STRATEGY MATCH-E				EMISSIONS SAVINGS				ECS SIZE (MM)
	NO. 33 ADVANCED TECHNOLOGY, STIPLING ENGINE, COAL (AFB)	FUEL SAVINGS RATIO	FUEL SAVINGS	TOTAL UTILITY FUEL	COST RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT SAVINGS \$000	UTILITY SAVINGS \$000	TOTAL SAVINGS \$000	EMISSIONS SAVINGS RATIO	
NO. 01 MEAT PACKING	0.233	24.4	48.0	0.147	57049	1136496	0.361	-19353	51337	31984	4.43		
NO. 02 BAKING	0.066	0.2	15.7	-0.232	-31636	454860	0.216	-11767	16786	5019	0.174		
NO. 03 MALT BEVERAGE	0.032	2.3	18.9	0.172	45203	504977	0.124	-13363	20256	6893	1.37		
NO. 04 WOVEN FABRIC MILL	0.093	10.0	77.8	-0.052	-20435	1456656	0.311	-51421	83275	31854	2.00		
NO. 05 SAW MILL	0.152	17.1	91.7	-0.506	-258651	4680910	0.366	-56989	98163	41174	0.214		
NO. 06 NEWSPRINT MILL	0.181	21.7	91.4	0.201	87642	781300	0.380	-52104	96292	44108	28.79		
NO. 07 WRITING PAPER MILL	0.152	16.9	59.1	0.258	126502	737418	0.305	-38318	74301	35983	18.67		
NO. 08 CORRUGATED PAPER	0.166	83.8	205.4	0.304	570707	2400752	0.283	-97255	218524	121269	23.45		
NO. 09 BOX BOARD	0.183	28.3	72.5	0.306	176190	755044	0.314	-34688	76864	42176	26.33		
NO. 10 CHLORINE	0.197	132.0	499.1	0.181	448218	5065358	0.387	-284614	540818	256204	23.33		
NO. 11 ALUMINA	-0.015	-1.7	32.0	0.109	48266	369969	0.093	-26124	34273	8149	17.12		
NO. 12 LOW DENS. POLYETHYL	0.161	28.1	149.6	0.137	87549	1359985	0.383	-91217	159056	67839	18.93		
NO. 13 HI DENS. POLYETHYL	0.124	9.5	53.7	0.147	41177	585815	0.324	-33770	57565	23795	9.67		
NO. 14 POLYVINYL CHLORIDE	0.109	12.6	73.7	0.150	63343	879546	0.297	-46784	78782	31998	6.92		
NO. 15 STYRENE-BUT. RUB.	0.037	0.7	4.2	0.168	12162	95285	0.104	-2953	4463	1510	1.52		
NO. 16 NYLON	0.111	3.2	20.7	0.099	10517	263816	0.317	-13289	22168	8878	4.02		
NO. 17 STYRENE	0.007	1.4	7.0	0.257	17476	271385	0.006	-6847	7532	685	3.35		
NO. 18 ETHYLENE	0.006	7.6	16.2	0.380	1543473	1134741	-0.014	-27745	16628	-11117	2.54		
NO. 19 PETROLEUM REFINING	0.015	59.3	293.3	0.367	5417895	5200091	0.023	-246585	313958	67373	19.62		
NO. 20 TIRES	0.009	9.8	55.8	0.149	60320	896581	0.248	-35517	59693	24175	7.21		
NO. 23 INTEGRATED STEEL	0.019	84.4	487.4	0.012	127288	7178091	0.047	-294465	521814	227349	29.45		
NO. 24 GRAY IRON FOUNDRY	0.060	9.2	74.2	0.207	115237	806284	0.212	-50696	79390	28694	17.93		
NO. 25 COPPER	0.088	14.0	82.6	0.172	181048	1139635	0.245	-53527	88446	34920	5.75		
NO. 26 MOTOR VEHICLE	0.083	17.3	93.8	0.092	69763	1449457	0.256	-59401	180465	41864	10.49		
TOTAL -- ALL		592	2623		9073254	39606432		-1648873	2828644	1171974			
FUEL SAVINGS CASES ONLY		554	2591		9025028	39236464		-1622749	2786571	1163824			
COST SAVINGS CASES ONLY		565	2438		9394015	33014064		-1528896	2622620	1093923			
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0			
FUEL & COST SAVINGS CASES		567	2406		9335749	32644096		-1502572	2583347	1085779			
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0	0	0			

Power Systems Division

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CIAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 32 ADVANCED TECHNOLOGY, STEELING ENGINE, COAL DERIVED BOILER GRADE			FUEL ENERGY TOTAL			UTILITY FULL			*** STRATEGY MATCH-E		
	FUEL SAVINGS RATIO	SAVINGS	COST	UTILITY FULL SAVINGS RATIO	SAVINGS	COST	EMISSIONS SAVINGS RATIO	SAVINGS	COST	EMISSIONS SAVINGS RATIO	SAVINGS	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 32 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL DERIVED BOILER GRADE

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU			COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS ----- TONS PER YEAR -----		
	10**12 BTU	UTILITY FUEL	SAVINGS	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	PLANT	UTILITY	TOTAL
TOTAL -- ALL	3366	9010		-948133	89695240			-4527722	9794066	5267120
FUEL SAVINGS CASES ONLY	3366	9010		-948133	89695240			-4527722	9794066	5267120
COST SAVINGS CASES ONLY	1746	4495		966222	37299744			-2100883	4956811	2857929
EMISSIONS SAVINGS CASE ONLY	0	0		0	0			0	0	0
FUEL & COST SAVINGS CASES	1746	4495		966222	37299744			-2100883	4956811	2857929
FUEL, COST & EMISSION SAVING	0	0		0	0			0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU			COAL DERIVED			TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	NATURAL GAS	PETROLEUM DISTILLATE	BOILER FUEL	
TOTAL -- ALL	14654	-425	6002	0	0	-26946	7804
FUEL SAVINGS CASES ONLY	14654	-425	6002	0	0	-26946	7804
COST SAVINGS CASES ONLY	1245	0	1075	0	0	-5898	5324
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1245	0	1075	0	0	-5898	5324
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6002	0	0	-26946	7804	2197	3366
FUEL SAVINGS CASES ONLY	14654	-425	6002	0	0	-26946	7804	2197	3366
COST SAVINGS CASES ONLY	1245	0	1075	0	0	-5898	5324	0	1746
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1245	0	1075	0	0	-5898	5324	0	1746
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	0	-1674	2197	523
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	-1674	2197	523
COST SAVINGS CASES ONLY	0	0	0	0	0	0	212	0	212
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	212	0	212
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

Power Systems Division

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CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 33 ADVANCED TECHNOLOGY, STIPLING ENGINE, COAL (AFB)				*** STRATEGY MATCH-E			EMISSIONS SAVINGS			ECS SIZE (MM)	
	FUEL SAVINGS RATIO	SAVINGS FUEL	TOTAL UTILITY	COST RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	COST SAVINGS RATIO	PLANT	UTILITY	SAVINGS TOTAL		
NO. 01 MEAT PACKING	0.233	24.4	48.0	0.147	57049	1138496	0.361	-19353	51337	31984	4.43	
NO. 02 BAKING	0.066	0.2	15.7	-0.222	-31636	454860	0.216	-11767	16786	5019	0.174	
NO. 03 MALT BEVERAGE	0.032	2.3	18.9	0.172	45203	504977	0.124	-13363	20256	6893	1.37	
NO. 04 WOVEN FIBRIC MILL	0.093	10.0	77.8	-0.052	-20435	1456656	0.311	-51421	83275	31854	2.00	
NO. 05 SAW MILL	0.152	17.1	91.7	-0.506	-258651	4680910	0.366	-56989	98163	41174	0.214	
NO. 06 NEWSRINT MILL	0.181	21.7	91.4	0.201	87642	781360	0.380	-52104	96292	44108	28.79	
NO. 07 WRITING PAPER MILL	0.152	16.9	59.1	0.258	126502	737410	0.305	-38318	74301	35983	18.67	
NO. 08 CORRUGATED PAPER	0.166	83.8	205.4	0.304	570707	2400752	0.283	-97255	218524	121269	23.45	
NO. 09 BOX BOARD	0.183	28.3	72.5	0.306	176190	755044	0.314	-34688	78664	42176	26.33	
NO. 10 CHLORINE	0.197	132.0	499.1	0.181	448218	5065358	0.387	-284614	540818	256204	23.33	
NO. 11 ALUMINA	-0.015	-1.7	32.0	0.109	48266	369969	0.093	-26124	34273	8149	17.12	
NO. 12 LOW DENS. POLYETHYL	0.161	28.1	148.6	0.137	87549	1359985	0.383	-91217	159056	67839	18.93	
NO. 13 HI DENS. POLYETHYL	0.124	9.5	53.7	0.147	41177	585815	0.324	-33770	57565	23795	9.67	
NO. 14 POLYVINYL CHLORIDE	0.109	12.6	73.7	0.150	63343	879546	0.297	-46784	78782	31998	6.92	
NO. 15 STYRENE-BUT. RUB.	0.037	0.7	4.2	0.168	12162	95285	0.104	-2953	4463	1510	1.52	
NO. 16 NYLON	0.111	3.2	20.7	0.099	10517	263816	0.317	-13289	22168	8878	4.02	
NO. 17 STYRENE	0.007	1.4	7.0	0.257	174476	271385	0.006	-6847	7532	685	3.35	
NO. 18 ETHYLENE	0.006	7.6	16.2	0.380	1543473	1134741	-0.014	-27745	16628	-11117	2.54	
NO. 19 PETROLEUM REFINING	0.015	59.3	293.3	0.367	5417895	5200091	0.023	-246585	313958	67373	19.62	
NO. 20 TIRES	0.009	9.8	55.8	0.149	60320	896581	0.248	-35517	59693	24175	7.21	
NO. 23 INTEGRATED STEEL	0.019	84.4	487.4	0.012	127288	7178091	0.047	-294465	521814	227349	29.45	
NO. 24 GRAY IRON FOUNDRY	0.060	9.2	74.2	0.207	115237	806284	0.212	-50696	79390	28694	17.93	
NO. 25 COPPER	0.088	14.0	82.6	0.172	101048	1139635	0.245	-53527	88446	34920	5.75	
NO. 26 MOTOR VEHICLE	0.083	17.3	93.8	0.092	69763	1449457	0.256	-59401	180465	41864	10.49	
<hr/>												
TOTAL -- ALL	592	2623	9073294	39606432	1648873	2828644	1171974					
FUEL SAVINGS CASES ONLY	554	2591	9025028	39236464	-1622749	2786571	1163824					
COST SAVINGS CASES ONLY	565	2438	9394015	33014064	-1528896	2622620	1093923					
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0					
FUEL & COST SAVINGS CASES	567	2406	9335749	32644096	-1502572	2583347	1085779					
FUEL, COST & EMISSIONS SAVING	0	0	0	0	0	0	0					

YEAR : 1990
 RD-33 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL (AFB)
 NATIONAL SUMMARY
 *** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		TOTAL UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU
TOTAL -- ALL	2115	9019	31705296	123451936	-5659792	9794666	4135062			
FUEL SAVINGS CASES ONLY	2133	8687	31205200	119618656	-5389120	9439756	4050624			
COST SAVINGS CASES ONLY	2063	8663	32300590	110815520	-5429438	9414908	3985462			
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0			
FUEL & COST SAVINGS CASES	2060	8331	31800800	106982240	-5158765	9059798	3901025			
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0			

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU
TOTAL -- ALL	2115	9019	31705296	123451936	-5659792	9794666
FUEL SAVINGS CASES ONLY	2133	8687	31205200	119618656	-5389120	9439756
COST SAVINGS CASES ONLY	2063	8663	32300590	110815520	-5429438	9414908
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	2060	8331	31800800	106982240	-5158765	9059798
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU
TOTAL -- ALL	14654	-425	6082	0	-20393	2197
FUEL SAVINGS CASES ONLY	14231	-17	5635	0	-19964	2197
COST SAVINGS CASES ONLY	14621	-425	6051	0	-20352	2167
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14198	-17	5655	0	-19923	2167
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU
TOTAL -- ALL	14654	-425	6082	0	-20393	2197
FUEL SAVINGS CASES ONLY	14231	-17	5635	0	-19964	2197
COST SAVINGS CASES ONLY	14621	-425	6051	0	-20352	2167
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14198	-17	5655	0	-19923	2167
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

YEAR : 1990
 RD-33 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL (AFB)
 NATIONAL SUMMARY
 *** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		TOTAL UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU	10**12 BTU 10**12 BTU
TOTAL -- ALL	2115	9019	31705296	123451936	-5659792	9794666	4135062			
FUEL SAVINGS CASES ONLY	2133	8687	31205200	119618656	-5389120	9439756	4050624			
COST SAVINGS CASES ONLY	2063	8663	32300590	110815520	-5429438	9414908	3985462			
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0			
FUEL & COST SAVINGS CASES	2060	8331	31800800	106982240	-5158765	9059798	3901025			
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0			

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM
TOTAL -- ALL	14654	-425	6082	0	-20393	2197
FUEL SAVINGS CASES ONLY	14231	-17	5635	0	-19964	2197
COST SAVINGS CASES ONLY	14621	-425	6051	0	-20352	2167
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14198	-17	5655	0	-19923	2167
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM
TOTAL -- ALL	14654	-425	6082	0	-20393	2197
FUEL SAVINGS CASES ONLY	14231	-17	5635	0	-19964	2197
COST SAVINGS CASES ONLY	14621	-425	6051	0	-20352	2167
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14198	-17	5655	0	-19923	2167
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM
TOTAL -- ALL	14654	-425	6082	0	-20393	2197
FUEL SAVINGS CASES ONLY	14231	-17	5635	0	-19964	2197
COST SAVINGS CASES ONLY	14621	-425	6051	0	-20352	2167
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	14198	-17	5655	0	-19923	2167
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

Power Systems Division

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CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO. 34 ADVANCED TECHNOLOGY, THERMIONICS, COAL											
INDUSTRY	FUEL ENERGY		TOTAL		DERIVED BOILER GRADE		CAPITAL		EMISSIONS MATCH-E		ECS SIZE (MM)
	SAVINGS RATIO	SAVINGS FUEL	SAVINGS FUEL	SAVINGS FUEL	COST DOLLARS \$000	SAVINGS RATIO	COST \$000	SAVINGS RATIO	PLANT UTILITY	SAVINGS TOTAL	
*** STRATEGY MATCH-E											
EMISSIONS SAVINGS											
PLANT UTILITY TOTAL											
TONS PER YEAR											
TOTAL											
NO. 01 MEAT PACKING	0.114	12.0	48.0	-0.261	-101555	1330575	0.273	-27129	51337	24208	4.36
NO. 02 BAKIN	-0.117	-4.7	15.7	-0.507	-72410	388142	0.083	-14850	16786	1936	0.16*
NO. 03 MALT BEVERAGE	0.165	11.7	18.9	-0.008	-2067	410349	0.255	-6068	20256	14188	1.32
NO. 04 WOVEN FABRIC MILL	-0.395	-42.6	77.8	-0.857	-339805	1633135	-0.040	-87377	83274	-4103	1.98
NO. 05 SAW MILL	-0.492	-55.3	91.7	-0.829	-424098	2862851	-0.075	-106574	98163	-8411	0.20*
NO. 06 NEWSPRINT MILL	-0.431	-51.7	91.4	-0.742	-323731	1184556	-0.050	-102105	96292	-5813	70.92
NO. 07 WRITING PAPER MILL	0.032	3.5	59.1	-0.178	-87251	952722	0.223	-47980	74301	26322	17.98
NO. 08 CORRUGATED PAPER	0.243	123.1	205.4	0.080	150519	2783130	0.360	-64070	218524	154454	45.49
NO. 09 BOX BOARD	0.146	22.6	72.5	-0.037	-21383	971699	0.296	-37033	76864	39831	38.26
NO. 10 CHLORINE	-0.342	-229.0	499.1	-0.671	-1665074	6898442	0.007	-536039	540818	4780	46.31
NO. 11 ALUMINA	0.104	11.6	32.0	-0.020	-8789	463295	0.211	-15788	34273	18486	16.43
NO. 12 LOW DENS. POLYETHYL	-0.631	-110.1	148.6	-1.032	-659699	2186273	-0.160	-187373	159056	-28317	18.96
NO. 13 HI DENS. POLYETHYL	-0.330	-25.2	53.7	-0.664	-186380	811337	0.001	-57505	57565	60	9.56
NO. 14 POLYVINYL CHLORIDE	-0.201	-23.2	73.7	-0.507	-214300	1124873	0.075	-70717	78782	8065	6.80
NO. 15 STYRENE-BUT. RUB.	0.144	2.7	4.2	0.015	1062	78188	0.212	-1385	4463	3078	1.45
NO. 16 NYLON	-0.354	-10.2	20.7	-0.696	-74215	320466	-0.011	-22477	22168	-310	3.98
NO. 17 STYRENE	0.011	2.1	7.0	-0.069	-47050	232223	0.012	-6162	7532	1370	3.41
NO. 19 ETHYLENE	0.018	21.5	16.2	-0.025	-101763	916678	-0.001	-17694	16628	-1066	3.91
NO. 19 PETROLEUM REFINING	0.056	227.5	293.3	-0.021	-311063	7616923	0.066	-117932	313958	196026	21.82
NO. 20 TIRES	0.057	6.3	55.8	-0.231	-93486	1060849	0.237	-36635	59693	23057	6.97
NO. 23 INTEGRATED STEEL	-0.046	-209.2	487.4	-0.169	-1797895	11689563	0.005	-495589	521814	26225	67.83
NO. 24 GRAY IRON FOUNDRY	-0.239	-37.0	74.2	-0.512	-285562	1215894	-0.021	-82216	79390	-2826	17.86
NO. 25 COPPER	0.045	7.2	82.6	-0.210	-123732	1308456	0.225	-56355	88446	32092	5.56
NO. 26 MOTOR VEHICLE	0.026	5.4	93.8	-0.280	-212507	1823374	0.217	-65648	100465	34817	10.16
TOTAL -- ALL					-341	2623		-226295	2820843	558149	
FUEL SAVINGS CASES ONLY					457	939		-499878	1066741	566863	
COST SAVINGS CASES ONLY					126	210		-65455	222987	157532	
EMISSIONS SAVINGS CASE ONLY					0	0		0	0	0	
FUEL & COST SAVINGS CASES					126	210		-65455	222987	157532	
FUEL, COST & EMISSION SAVING					0	0		0	0	0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 34 ADVANCED TECHNOLOGY, THERMIONICS, COAL DERIVED BOILER GRADE

*** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	COST \$000	COST \$000	PLANT	UTILITY	EMISSIONS SAVINGS	EMISSIONS SAVINGS
ALL	-1303	9018			-23080800		157388688		-7926708	9794864	1868156	1868156
FUEL SAVINGS CASES ONLY	1468	3671			-3431493		68712592		-2058901	4079735	2020841	2020841
COST SAVINGS CASES ONLY	516	860			620353		11756047		-268610	914880	646270	646270
EMISSIONS SAVINGS CASE ONLY	0	0			0		0		0	0	0	0
FUEL & COST SAVINGS CASES	516	860			620353		11756047		-268610	914880	646270	646270
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	COAL	OTHER
ALL	14654	-425	0	0	-31615	7804
FUEL SAVINGS CASES ONLY	12567	-425	0	0	-21974	4748
COST SAVINGS CASES ONLY	635	-17	0	0	-1626	1111
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	635	-17	0	0	-1626	1111
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	COAL	OTHER
ALL	14654	-425	0	0	-31615	7804
FUEL SAVINGS CASES ONLY	12567	-425	0	0	-21974	4748
COST SAVINGS CASES ONLY	635	-17	0	0	-1626	1111
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	635	-17	0	0	-1626	1111
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	NATURAL GAS	PETROLEUM	COAL	OTHER
ALL	14654	-425	0	0	-31615	7804
FUEL SAVINGS CASES ONLY	12567	-425	0	0	-21974	4748
COST SAVINGS CASES ONLY	635	-17	0	0	-1626	1111
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	635	-17	0	0	-1626	1111
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

Power Systems Division

FCR-1333

CIAS GENERAL SUMMARY - PROCESS LEVEL																			
NO. 35 ADVANCED TECHNOLOGY, THERMIONICS, COAL																			
INDUSTRY	FUEL ENERGY TOTAL		DER. D.G. (COMP. CONFIG.)		UTILITY SAVINGS		FUEL SAVINGS		RATIO	CAPITAL COST \$000		EMISSIONS SAVINGS		SAVINGS PER YEAR		EMISSIONS SAVINGS		TOTAL	
	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL		RATIO	SAVINGS	RATIO	SAVINGS	PLANT	UTILITY	SAVINGS	PLANT	UTILITY	SAVINGS
NO. 01 MEAT PACKING	0.135	14.2	48.0	-0.233	-90835					0.291	1332907	0.291	-25511	51337	25826	4.38			
NO. 02 BAKING	-0.062	-2.5	15.7	-0.553	-78922					0.151	540877	0.151	-13261	16786	3524	0.16*			
NO. 03 MALT BEVERAGE	0.016	1.2	18.9	-0.189	-49900					0.118	506970	0.118	-13684	20256	6572	1.34*			
NO. 04 WOVEN FABRIC MILL	-0.172	-18.6	77.8	-0.657	-260591					0.129	1766339	0.129	-70040	83274	13235	1.97			
NO. 05 SAW MILL	-0.407	-45.7	91.7	-0.999	-511093					-0.013	4089679	-0.013	-99609	98163	-1446	0.20*			
NO. 06 NEWSPRINT MILL	0.175	21.0	91.4	-0.047	-20345					0.394	835373	0.394	-50490	96292	45802	70.55			
NO. 07 WRITING PAPER MILL	0.217	24.2	59.1	0.035	17342					0.372	827659	0.372	-30467	74301	43834	18.21			
NO. 08 CORRUGATED PAPER	0.173	87.4	205.4	0.044	83260					0.300	2257821	0.300	-89697	218524	128827	46.07			
NO. 09 BOX BOARD	0.195	30.2	72.5	0.047	27249					0.336	795889	0.336	-31604	76864	45260	38.75			
NO. 10 CHLORINE	0.249	165.4	499.1	0.017	42682					0.444	4887148	0.444	-247002	540818	293817	45.66			
NO. 11 ALUMINA	0.026	2.9	32.0	-0.082	-36112					0.140	434367	0.140	-22007	34273	12267	15.64			
NO. 12 LOW DENS. POLYETHYL	0.035	6.1	148.6	-0.265	-169591					0.314	1661714	0.314	-103431	159056	55625	18.60			
NO. 13 HI DENS. POLYETHYL	0.150	11.4	53.7	-0.119	-33525					0.361	665924	0.361	-31037	57565	26528	9.46			
NO. 14 POLYVINYL CHLORIDE	0.116	13.4	73.7	-0.152	-64478					0.319	1013818	0.319	-44360	78782	34422	6.78			
NO. 15 STYRENE-BUT. RUB.	0.025	0.5	4.2	-0.122	-8817					0.100	95747	0.100	-3009	4463	1454	1.48*			
NO. 16 NYLON	0.032	0.9	20.7	-0.284	-30281					0.277	304214	0.277	-14407	22168	7761	3.95			
NO. 17 STYRENE	-0.003	-0.5	7.0	-0.084	-57244					-0.005	240628	-0.005	-8059	7532	-527	3.44			
NO. 18 ETHYLENE	0.011	13.5	16.2	-0.032	-129137					-0.008	918177	-0.008	-23282	16628	-6655	3.95			
NO. 19 PETROLEUM REFINING	0.051	208.3	293.3	-0.019	-274776					0.061	6736621	0.061	-131775	313958	182183	22.07			
NO. 20 TIRES	0.139	15.1	55.8	-0.142	-57710					0.302	1055927	0.302	-30271	59693	29422	7.00			
NO. 23 INTEGRATED STEEL	0.026	118.4	467.4	-0.023	-249697					0.054	8691290	0.054	-258964	521814	262850	67.23			
NO. 24 GRAY IRON FOUNDRY	0.130	20.2	74.2	-0.078	-43299					0.284	947731	0.284	-40945	79390	38445	17.64			
NO. 25 COPPER	0.107	17.1	82.6	-0.149	-87465					0.275	1346913	0.275	-49270	88446	39177	5.59			
NO. 26 MOTOR VEHICLE	0.133	27.7	93.8	-0.147	-111701					0.318	1689767	0.318	-49509	100465	50956	10.19			
TOTAL -- ALL		733	2623		-219353						43643408		-1481689	2820843	1339157				
FUEL SAVINGS CASES ONLY		800	2431		-1286137						37005936		-1290721	2615089	1324370				
COST SAVINGS CASES ONLY		308	836		170532						8768516		-358770	910507	511738				
EMISSIONS SAVINGS CASE ONLY		0	0		0						0		0	0	0				
FUEL & COST SAVINGS CASES		308	836		170532						6768516		-398770	910507	511738				
FUEL, COST & EMISSIONS SAVING		0	0		0						0		0	0	0				

YEAR : 1990
 NO.35 ADVANCED TECHNOLOGY, THERMIONICS, COAL DER. B.G. (COMP. CONFIG.)
 NATIONAL SUMMARY
 *** STRATEGY MATCH-E

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	UTILITY	0	0
TOTAL -- ALL	2501	9018			-5991830	133781760			-5143438	9794866	4651416	
FUEL SAVINGS CASES ONLY	2630	8638			-4159311	120670720			-4764391	9388322	4623921	
COST SAVINGS CASES ONLY	1214	3137			805356	35773712			-1504169	3528014	2023847	
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0	0	
FUEL & COST SAVINGS CASES	1214	3137			805356	35773712			-1504169	3528014	2023847	
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
TOTAL -- ALL	14654	-425	6082	0	-27811	7804
FUEL SAVINGS CASES ONLY	14333	-425	5901	0	-26670	7355
COST SAVINGS CASES ONLY	1069	0	900	0	-4646	3892
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1069	0	900	0	-4646	3892
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
TOTAL -- ALL	14654	-425	6082	0	-27811	7804
FUEL SAVINGS CASES ONLY	14333	-425	5901	0	-26670	7355
COST SAVINGS CASES ONLY	1069	0	900	0	-4646	3892
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1069	0	900	0	-4646	3892
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
TOTAL -- ALL	14654	-425	6082	0	-27811	7804
FUEL SAVINGS CASES ONLY	14333	-425	5901	0	-26670	7355
COST SAVINGS CASES ONLY	1069	0	900	0	-4646	3892
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1069	0	900	0	-4646	3892
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

TABLE VI-4
SUMMARY RESULTS
MATCH THERMAL STRATEGY

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-T				EMISSIONS SAVINGS		01 ECS SIZE (MM)
NO. 1 CURRENT TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), PET. B.G.										CAPITAL EMISSIONS		SAVINGS		TOTAL		
INDUSTRY	FUEL SAVINGS RATIO	ENERGY TOTAL	UTILITY FUEL	SAVINGS RATIO	COST DOLLARS \$000	SAVINGS RATIO	PLANT UTILITY	SAVINGS RATIO	TOTAL UTILITY	SAVINGS RATIO	PLANT UTILITY	SAVINGS RATIO	TOTAL UTILITY	SAVINGS RATIO		
NO. 01 MEAT PACKING	0.121	12.7	25.9	-0.026	-10287	0.214	-9554	27710	18156	2.43						
NO. 02 BAKING	0.042	1.7	4.7	-0.157	-22428	0.130	-2097	5034	2937	0.04*						
NO. 03 MALT BEVERAGE	0.155	11.8	24.2	-0.006	-1561	0.297	-8791	25905	17114	1.42						
NO. 04 WOVEN FABRIC MILL	0.005	0.6	3.2	-0.030	-11729	0.013	-2107	3446	1339	0.08*						
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	12986	98163	111149	0.00						
NO. 06 NEWSPRINT MILL	0.043	5.7	13.8	0.024	10465	0.079	-5551	14576	9025	10.32						
NO. 07 WRITING PAPER MILL	0.111	12.4	25.9	0.059	28864	0.190	-11049	32560	21512	7.78						
NO. 08 CORRUGATED PAPER	0.198	100.3	193.8	0.139	260039	0.347	-64691	206158	141467	42.27						
NO. 09 BOX BOARD	0.176	27.2	52.6	0.120	68734	0.298	-17517	55805	38289	27.31						
NO. 10 CHLORINE	0.060	40.4	37.6	0.039	97792	0.061	-1459	40722	39263	3.35						
NO. 11 ALUMINA	-0.052	-5.7	5.4	-0.067	-29612	-0.028	-8103	5758	-2345	2.46						
NO. 12 LOW DENS. POLYETHYL	-0.002	-0.3	5.6	-0.021	-13284	0.010	-4271	5958	1686	0.68						
NO. 13 HI DENS. POLYETHYL	0.012	0.9	2.1	-0.011	-3065	0.015	-1146	2193	1052	0.35*						
NO. 14 POLYVINYL CHLORIDE	0.002	0.2	5.4	-0.032	-13621	0.016	-4070	5727	1657	0.48*						
NO. 15 STYRENE-BUT. RUB.	0.063	1.2	2.2	-0.012	-871	0.102	-960	2360	1400	0.82						
NO. 16 NYLON	-0.002	0.0	1.6	-0.038	-4049	0.019	-1153	1678	526	0.31*						
NO. 17 STYRENE	0.003	0.7	36.8	-0.172	-116658	0.103	-25759	39401	13642	17.76						
NO. 18 ETHYLENE	0.028	32.7	21.7	-0.005	-21471	0.014	-12385	22329	9943	3.68						
NO. 19 PETROLEUM REFINING	0.026	115.1	74.3	0.000	-1744	0.016	-36736	79510	42774	5.02						
NO. 20 TIRES	0.014	1.5	6.1	-0.027	-11037	0.030	-3771	6547	2776	0.69						
NO. 23 INTEGRATED STEEL	0.000	0.0	437.4	0.000	0	0.000	4342768	521814	4864582	0.00						
NO. 24 GRAY IRON FOUNDRY	0.006	1.0	2.9	-0.022	-12241	0.001	-2995	3134	139	0.65						
NO. 25 COPPER	0.012	1.9	9.0	-0.033	-19346	0.024	-6338	9619	3281	0.57*						
NO. 26 MOTOR VEHICLE	0.009	1.8	10.2	-0.066	-50007	0.026	-7019	10955	3936	1.04						
TOTAL -- ALL										7507877	4118233	1227063	5345297			
FUEL SAVINGS CASES ONLY										7321413	-223992	593694	269701			
COST SAVINGS CASES ONLY										2361440	-100265	349820	249555			
EMISSIONS SAVINGS CASE ONLY										0	4355753	619977	4975731			
FUEL & COST SAVINGS CASES										2361440	-100265	349820	249555			
FUEL-COST & EMISSIONS SAVING										0	0	0	0			

COGENERATION TECHNOLOGY ALTERNATIVES STUDY - NATIONAL SUMMARY

YEAR : 1990

NO. 1 CURRENT TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), PET. B.G.

**** STRATEGY MATCH-T

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
						TONS PER YEAR	
TOTAL -- ALL	1350	3528	831597	29002304	7287947	3832137	11120099
FUEL SAVINGS CASES ONLY	1421	2331	1215708	27220592	-952770	2549773	1597013
COST SAVINGS CASES ONLY	631	1682	2148104	13149597	-585912	1862652	1276740
EMISSION'S SAVINGS CASE ONLY	0	1110	0	0	8349152	1189378	9537533
FUEL & COST SAVINGS CASES	891	1682	2148104	13149587	-555912	1862652	1276740
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS	--- 10**12 BTU ---	TOTAL FUEL
NATURAL PETROLEUM BOILER	PETROLEUM FUEL	COAL DERIVED	OTHER FUEL SAVING\$
GAS DISTILLATE BOILER	DISTILLATE BOILER FUEL	COAL DISTILLATE BOILER FUEL	COAL FUEL

SITE PLUS UTILITY

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INCLUDING COAL FUEL CONVERSION

TOTAL	-- ALL	-425	-16251	0	0	10889	2197	1360
FUEL SAVINGS CASES ONLY		-17	-16550	0	0	3791	1518	1421
COST SAVINGS CASES ONLY		0	-2874	0	0	2511	0	881
EMISSIONS SAVINGS CASE ONLY		0	592	0	0	6177	664	0
FUEL & COST SAVINGS CASES		0	-2874	0	0	2511	0	881
FUEL, COST & EMISSION SAVING		0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CIAS GENERAL SUMMARY - PROCESS LEVEL											
NO. 2 CURRENT TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		COST		SAVINGS DOLLARS \$000	*** STRATEGY MATCH-T			ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	FUEL SAVINGS	FUEL SAVINGS	RATIO	CAPITAL COST \$000		EMISSIONS SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR	
NO. 01 MEAT PACKING	0.075	7.9	27.5	-0.064	-24722	1516794	-0.088	-37181	29372	-7808	2.62
NO. 02 BAKING	0.033	1.3	4.5	-0.135	-19303	288355	-0.060	-6236	4846	-1390	0.04*
NO. 03 MALT BEVERAGE	0.106	8.1	24.7	0.059	15637	983598	-0.105	-32913	26449	-6464	1.47
NO. 04 WOVEN FABRIC MILL	-0.007	-0.8	2.8	-0.001	-329	409690	-0.023	-5392	3030	-2362	0.07*
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00
NO. 06 NEWSRINT MILL	0.024	2.9	14.0	0.073	32022	342259	-0.046	-20093	14786	-5308	10.85
NO. 07 WRITING PAPER MILL	0.053	5.9	27.5	0.131	63943	858188	-0.108	-47320	34578	-12742	8.58
NO. 08 CORRUGATED PAPER	0.130	65.9	198.1	0.263	531704	3139797	-0.090	-249548	210785	-38763	44.61
NO. 09 DOX BOARD	0.113	17.5	54.6	0.238	136890	945701	-0.084	-69170	57916	-11254	29.24
NO. 10 CHLORINE	0.054	36.2	36.5	0.091	225995	1453279	0.003	-37425	39539	2114	3.31
NO. 11 ALUMINA	-0.078	-8.7	6.0	0.035	15326	315613	-0.119	-16883	6451	-10431	2.86
NO. 12 LOW DENS. POLYETHYL	-0.009	-1.5	5.4	0.008	5176	360362	-0.021	-9555	5768	-3787	0.67
NO. 13 HI DENS. POLYETHYL	-0.032	-2.5	3.9	0.011	3007	293265	-0.052	-7998	4162	-3837	0.69
NO. 14 POLYVINYL CHLORIDE	-0.015	-1.7	5.3	0.034	14280	486477	-0.039	-9881	5657	-4223	0.49*
NO. 15 STYRENE-BUT. RUB.	0.024	0.5	2.3	0.072	5183	146794	-0.075	-3557	2473	-1084	0.88
NO. 16 NYLON	-0.013	-0.4	1.5	0.016	1744	116143	-0.036	-2610	1608	-1002	0.30*
NO. 17 STYRENE	-0.057	-10.8	11.2	0.094	63768	1021506	-0.565	-77582	11945	-65637	7.10
NO. 18 ETHYLENE	-0.001	-1.5	20.9	0.356	1443101	1816687	-0.043	-55958	21503	-34455	3.32
NO. 19 PETROLEUM REFINING	-0.004	-14.6	77.3	0.340	5015976	5522032	-0.041	-206206	82726	-123480	5.09
NO. 20 TIRES	-0.021	-2.3	6.0	0.033	13441	675060	-0.056	-11865	6454	-5410	0.70
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00
NO. 24 GRAY IRON FOUNDRY	-0.010	-1.6	5.6	0.173	96422	187465	-0.027	-6423	2796	-3627	0.57*
NO. 25 COPPER	-0.024	-3.8	8.9	0.044	26138	866343	-0.063	-18416	9484	-8932	0.58*
NO. 26 MOTOR VEHICLE	-0.023	-4.7	10.2	-0.012	-9313	1046785	-0.062	-20742	10959	-9964	1.08
TOTAL -- ALL											
FUEL SAVINGS CASES ONLY							22792160	3404080	1213263	4617346	
COST SAVINGS CASES ONLY							967349	9674762	420745	-82699	
EMISSIONS SAVINGS CASE ONLY							7709753	19530544	545080	-338322	
FUEL & COST SAVINGS CASES							0	0	619977	4977213	
FUEL, COST & EMISSION SAVING							1011374	7869614	386526	-73500	
							0	0	0	0	

YEAR : 1990
 NO. 2 CURRENT TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT.), COAL
 NATIONAL SUMMARY
 *** STRATEGY MATCH-T
 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	365	3505	25640560	87138048	4272999	3811295	8084295
FUEL SAVINGS CASES ONLY	539	1852	4637793	43865904	-2552158	2048987	-503172
COST SAVINGS CASES ONLY	358	2308	25743424	80856144	-3945292	2530515	-1414781
EMISSIONS SAVINGS CASE ONLY	0	1110	0	0	8351995	1188378	9540373
FUEL & COST SAVINGS CASES	571	1791	4722181	40405776	-2468936	1983397	-4655540
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU -----				TOTAL FUEL	
	NATURAL GAS	PETROLEUM	DISTILLATE	BOILER FUEL	COAL	OTHER
TOTAL -- ALL	14654	-425	6082	0	-13238	2197
FUEL SAVINGS CASES ONLY	1410	-17	1129	0	-1971	39
COST SAVINGS CASES ONLY	13035	-425	5436	0	-19176	1488
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	6177	664
FUEL & COST SAVINGS CASES	1349	-17	1109	0	-1891	22
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	-13238	2197	365
FUEL SAVINGS CASES ONLY	1410	-17	1129	0	0	-1971	39	589
COST SAVINGS CASES ONLY	13035	-425	5436	0	0	-19176	1488	358
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	0	6177	664	0
FUEL & COST SAVINGS CASES	1349	-17	1109	0	0	-1891	22	571
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	-13238	2197	365
FUEL SAVINGS CASES ONLY	1410	-17	1129	0	0	-1971	39	589
COST SAVINGS CASES ONLY	13035	-425	5436	0	0	-19176	1488	358
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	0	6177	664	0
FUEL & COST SAVINGS CASES	1349	-17	1109	0	0	-1891	22	571
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-T				EMISSIONS SAVINGS				01 ECS SIZE (MW)	
NO. 3 CURRENT TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.										CAPITAL COST \$000	SAVINGS RATIO	SAVINGS \$000	SAVINGS RATIO	----- TONS PER YEAR -----		TOTAL			
INDUSTRY	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL	UTILITY SAVINGS	COST RATIO	SAVINGS \$000	SAVINGS RATIO	SAVINGS \$000	SAVINGS RATIO					PLANT	UTILITY				
NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000		0	0.000	0	0.000	33502	51337	64839	0.00						
NO. 02 BAKING	0.193	12.6	40.9	-0.631		-90065	-0.733	286587	-0.733	-80179	43808	-36371	0.35*						
NO. 03 MALT BEVERAGE	0.000	0.0	18.9	0.000		0	0.000	0	0.000	31683	20256	51939	0.00						
NO. 04 MOVEN FABRIC MILL	0.235	38.3	132.6	-0.549		-217844	-0.748	895526	-0.748	-261031	141903	-119128	1.52						
NO. 05 SAW MILL	0.000	0.0	91.7	0.000		0	0.000	0	0.000	12986	98163	111149	0.00						
NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000		0	0.000	0	0.000	17873	96292	114165	0.00						
NO. 07 WRITING PAPER MILL	0.000	0.0	59.1	0.000		0	0.000	0	0.000	39091	74301	113392	0.00						
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000		0	0.000	0	0.000	189040	218524	407564	0.00						
NO. 09 BOX BOARD	0.000	0.0	72.5	0.000		0	0.000	0	0.000	51753	76864	128618	0.00						
NO. 10 CHLORINE	0.000	0.0	499.1	0.000		0	0.000	0	0.000	108046	540819	648865	0.00						
NO. 11 ALUMINA	0.000	0.0	32.0	0.000		0	0.000	0	0.000	50357	34273	84630	0.00						
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000		0	0.000	0	0.000	16289	159056	175345	0.00						
NO. 13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000		0	0.000	0	0.000	14309	57565	71874	0.00						
NO. 14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000		0	0.000	0	0.000	26099	78782	104880	0.00						
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000		0	0.000	0	0.000	9258	4463	13722	0.00						
NO. 16 NYLON	0.240	11.5	39.9	-0.610		-65069	-0.747	227705	-0.747	-78712	42806	-35906	1.50						
NO. 17 STYRENE	0.000	0.0	7.0	0.000		0	0.000	0	0.000	93480	7532	101012	0.00						
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000		0	0.000	0	0.000	700469	16678	717096	0.00						
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000		0	0.000	0	0.000	2396786	313959	2710745	0.00						
NO. 20 TIRES	0.000	0.0	55.8	0.000		0	0.000	0	0.000	33888	59693	93580	0.00						
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000		0	0.000	0	0.000	4342768	521814	4864582	0.00						
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000		0	0.000	0	0.000	50453	79390	129844	0.00						
NO. 25 COPPER	0.000	0.0	82.6	0.000		0	0.000	0	0.000	48510	88446	136956	0.00						
NO. 26 MOTOR VEHICLE	0.000	0.0	93.8	0.000		0	0.000	0	0.000	53826	100465	154091	0.00						
TOTAL -- ALL										1409817				7900343				10327480	
FUEL SAVINGS CASES ONLY										1409817				-419922				-191405	
COST SAVINGS CASES ONLY										0				0				0	
EMISSIONS SAVINGS CASE ONLY										0				8320264				11018885	
FUEL & COST SAVINGS CASES										0				0				0	
FUEL, COST & EMISSION SAVING										0				0				0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY - NATIONAL SUMMARY

YEAR : 1990

NO. 3 CURRENT TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.

*** STRATEGY MATCH-T

CATEGORY

TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
10**12 BTU		10**12 BTU		10**12 BTU		10**12 BTU		PLANT UTILITY		TOTAL	

	129	9224	-768382	2889409	20989024	10015554	31006592
TOTAL -- ALL	129	442	-768382	2889409	-869571	473189	-336382
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	8782	0	0	21858592	9542369	31400976
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

	FUEL SAVINGS	--- 10**12 BTU ---	TOTAL FUEL
NATURAL GAS	PETROLEUM	COAL DERIVED	OTHER
GAS	DISTILLATE OILER	DISTILLATE BOILER	FUEL
	FUEL	FUEL	SAVINGS

CATEGORY

SITE PLUS UTILITY

[illegible]

INCLUDING COAL FUEL CONVERSION

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2
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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO. 4 CURRENT TECHNOLOGY, DIESEL, LOW SPEED, PETROLEUM BOILER GRADE *** STRATEGY MATCH-T 07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TONS PER YEAR
TOTAL -- ALL	2751	10125			-6942219	92284040			609563	13704287
FUEL SAVINGS CASES ONLY	2751	9136			-6942219	92284040			-18881712	10518859
COST SAVINGS CASES ONLY	363	949			313740	6672746			-1799986	1026247
EMISSIONS SAVINGS CASE ONLY	0	2939			0	0			19482272	3185432
FUEL & COST SAVINGS CASES	363	949			313740	6672746			-1796956	1026247
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
NATIONAL PETROLEUM	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS	
14772	-425	-3590	0	0	18695	2197	2751
1623	-425	-8507	0	0	9377	182	2751
175	0	-1071	0	0	1181	78	363
13149	0	4917	0	0	8808	2015	0
175	0	-1071	0	0	1181	78	363
0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14772	-425	-3590	0	0	18695	2197	2751
FUEL SAVINGS CASES ONLY	1623	-425	-8507	0	0	9377	182	2751
COST SAVINGS CASES ONLY	175	0	-1071	0	0	1181	78	363
EMISSIONS SAVINGS CASE ONLY	13149	0	4917	0	0	8808	2015	0
FUEL & COST SAVINGS CASES	175	0	-1071	0	0	1181	78	363
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14772	-425	-3590	0	0	18695	2197	2751
FUEL SAVINGS CASES ONLY	1623	-425	-8507	0	0	9377	182	2751
COST SAVINGS CASES ONLY	175	0	-1071	0	0	1181	78	363
EMISSIONS SAVINGS CASE ONLY	13149	0	4917	0	0	8808	2015	0
FUEL & COST SAVINGS CASES	175	0	-1071	0	0	1181	78	363
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
INDUSTRY	NO. 5 CURRENT TECHNOLOGY	GAS TURBINE, DIRECT FIRED, PETROLEUM DIST	*** STRATEGY MATCH-T			EMISSIONS SAVINGS			01 ECS SIZE (MM)
			FUEL ENERGY TOTAL SAVINGS	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS PLANT UTILITY	TONS PER YEAR TOTAL	
			RATIO	SAVINGS	RATIO	\$000	RATIO	SAVINGS	
NO.01 MEAT PACKING	0.333	48.9	90.0	-0.061	-31597	50704	0.658	-10613	96230 85417 7.93
NO.02 BAKING	0.162	6.5	12.5	-0.133	-18942	150455	0.533	-1379	13379 12050 0.11*
NO.03 MALT BEVERAGE	0.310	44.7	92.0	-0.294	-77430	334819	0.648	-14068	99362 84294 5.07
NO.04 BROWN PAPER MILL	0.169	18.2	42.7	-0.036	-14225	289010	0.384	-7092	45721 38629 0.96*
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	12986	99163 111149 0.00
NO.06 NEWSPRINT MILL	0.224	26.8	49.9	0.070	30619	156537	0.408	-6037	52561 46544 35.55
NO.07 WRITING PAPER MILL	0.339	49.0	92.6	0.014	6733	367183	0.650	-13668	116457 102589 26.61
NO.08 CORRUGATED PAPER	0.343	231.9	522.5	-0.062	-115757	1439642	0.661	-63751	555031 492080 72.87
NO.09 BOX BOARD	0.342	77.4	144.1	-0.021	-12255	440281	0.660	-17731	152791 135060 71.82
NO.10 CHLORINE	0.241	161.3	255.8	0.096	242617	761023	0.400	-17709	277110 259409 21.60
NO.11 ALUMINA	0.215	36.7	91.4	-0.161	-71295	222649	0.528	-19555	97812 78257 42.27
NO.12 LOW DENS. POLYETHYL	0.134	23.3	48.5	0.026	16315	166172	0.252	-7710	51925 44215 5.58
NO.13 HI DENS. POLYETHYL	0.270	20.6	44.1	0.049	13831	140588	0.554	-7399	47196 39797 7.16
NO.14 POLYVINYL CHLORIDE	0.369	37.6	80.3	0.035	14991	259794	0.647	-13462	65917 72454 6.82
NO.15 STYRENE-PUT. PUB.	0.289	10.3	20.7	-0.232	-16754	72518	0.403	-3240	22246 19006 7.39
NO.16 NYLON	0.216	6.2	13.2	0.020	2146	56905	0.447	-1927	14180 12253 2.44
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	93480	7532 101012 0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	700469	16628 717096 0.00
NO.19 PETROLEUM REFINING	0.251	1391.9	1761.2	-0.5	-1697246	7067867	0.535	407156	1885141 2292297 71.56
NO.20 TILES	0.321	44.2	84.3	-0.008	-3165	309782	0.645	-10100	90163 80063 9.03
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814 4864582 0.00
NO.24 GRAY IRON FOUNDRY	0.152	23.5	39.2	0.034	18794	138556	0.288	-3541	40590 37348 7.54
NO.25 COPPER	0.320	63.2	120.2	-0.002	-1256	400016	0.643	-14697	128628 113931 7.14
NO.26 MOTOR VEHICLE	0.284	70.7	134.3	-0.019	-29823	502692	0.646	-16313	143810 127497 12.94
TOTAL FOR ALL		2443	4341		-1742696	13804535		5306516	4660504 9767024
FUEL SAVINGS CASES ONLY		2443	3733		-1742696	13804535		156815	4016170 4173186
COST SAVINGS CASES ONLY		343	623		346045	2048760		-71652	685262 614610
EMISSIONS SAVINGS CASE ONLY		1332	1364		-1697246	7067867		555858	152977 686136
FUEL & COST SAVINGS CASES		348	623		346045	2048760		-71652	686262 614610
FUEL, COST & EMISSIONS SAVINGS		0	0		0	0		0	0 0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO. 6 CURRENT TECHNOLOGY, COINB. CYCLE, DIR. FIRED, PETROLEUM DIST. *** STRATEGY MATCH-T 07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	8203	28186			-32469232	101696320			10589919	41475408
FUEL SAVINGS CASES ONLY	8203	26313			-32469232	101696320			-7953387	20932208
COST SAVINGS CASES ONLY	66	133			36820	677547			-25779	116099
EMISSIONS SAVINGS CASE ONLY	0	1873			0	0			18543296	20543248
FUEL & COST SAVINGS CASES	66	133			36820	677547			-25779	116099
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

FUEL SAVINGS --- 10**12 BTU		COAL DERIVED		TOTAL FUEL	
NATURAL PETROLEUM	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	
14772	5977	0	0	0	8203
2319	1566	0	0	0	8203
71	-101	0	0	0	66
12453	4411	0	0	0	0
71	-101	0	0	0	66
0	0	0	0	0	0

CATEGORY

SITE PLUS UTILITY

TOTAL -- ALL	14772	-23209	5977	0	34747	2197	8203
FUEL SAVINGS CASES ONLY	2319	-23209	1566	0	27358	170	8203
COST SAVINGS CASES ONLY	71	-116	-101	0	135	78	66
EMISSIONS SAVINGS CASE ONLY	12453	0	4411	0	7389	2027	0
FUEL & COST SAVINGS CASES	71	-116	-101	0	135	78	66
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14772	-23209	5977	0	34747	2197	8203
FUEL SAVINGS CASES ONLY	2319	-23209	1566	0	27358	170	8203
COST SAVINGS CASES ONLY	71	-116	-101	0	135	78	66
EMISSIONS SAVINGS CASE ONLY	12453	0	4411	0	7389	2027	0
FUEL & COST SAVINGS CASES	71	-116	-101	0	135	78	66
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-T				EMISSIONS SAVINGS		ECS			
NO. 7 ADVANCED TECHNOLOGY STEAM TURBINE-615 PSIA(EXT), COAL DER. B.G.										CAPITAL COST \$000		EMISSIONS SAVINGS \$000		RATIO		PLANT UTILITY		TOTAL	
INDUSTRY										FUEL ENERGY TOTAL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO		SAVINGS PER YEAR		TOTAL	
										SAVINGS FUEL		SAVINGS FUEL		RATIO					

07

COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 7 ADVANCED TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT.), COAL DER. B.G.

*** STRATEGY MATCH-T

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	1718	4356	890045	36574080	6834734	4714694	11549446
FUEL SAVINGS CASES ONLY	1772	3184	1191051	35409344	-1422124	3459162	2037050
COST SAVINGS CASES ONLY	1023	1969	2419355	14760776	-758801	2177538	1418739
EMISSIONS SAVINGS CASE ONLY	110	1191	313404	1159267	8370113	1276591	9646705
FUEL & COST SAVINGS CASES	1023	1969	2419355	14760776	-758801	2177538	1418739
FUEL, COST & EMISSION SAVING	118	81	313409	1159267	18117	83213	106331

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE FUEL	BOILER FUEL	DISTILLATE FUEL	BOILER FUEL	COAL FUEL	
TOTAL -- ALL	14654	-425	6092	0	-22803	10917	1718
FUEL SAVINGS CASES ONLY	12750	-17	5104	0	-22274	4677	1772
COST SAVINGS CASES ONLY	1245	0	1075	0	-4095	2798	1023
EMISSIONS SAVINGS CASE ONLY	1585	0	629	0	-346	6489	118
FUEL & COST SAVINGS CASES	1245	0	1075	0	-4095	2798	1023
FUEL, COST & EMISSION SAVING	104	0	47	0	-346	312	118

SITE PLUS UTILITY

TOTAL -- ALL	1481	0	582	0	0	4410	2197	-234
FUEL SAVINGS CASES ONLY	0	0	0	0	0	-1662	1532	-129
COST SAVINGS CASES ONLY	0	0	0	0	0	262	0	262
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	0	6211	664	34
FUEL & COST SAVINGS CASES	0	0	0	0	0	262	0	262
FUEL, COST & EMISSION SAVING	0	0	0	0	0	34	0	34

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	1481	0	582	0	0	4410	2197	-234
FUEL SAVINGS CASES ONLY	0	0	0	0	0	-1662	1532	-129
COST SAVINGS CASES ONLY	0	0	0	0	0	262	0	262
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	0	6211	664	34
FUEL & COST SAVINGS CASES	0	0	0	0	0	262	0	262
FUEL, COST & EMISSION SAVING	0	0	0	0	0	34	0	34

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 6 ADVANCED TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT), COAL(AB)									
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	RATIO	COST DOLLARS \$000	*** STRATEGY MATCH-T		EMISSIONS SAVINGS PLANT	ECS SIZE (MM)
						CAPITAL COST \$000	EMISSIONS SAVINGS RATIO		
NO.01 MEAT PACKING	0.096	10.1	26.7	0.004	1728	1230181	0.152	-15032	28528
NO.02 BAKING	0.038	1.5	4.3	-0.149	-21223	297098	0.091	-2519	4637
NO.03 MALT BEVERAGE	0.117	8.9	24.3	0.093	24483	841977	0.199	-13810	26034
NO.04 WOVEN FABRIC MILL	-0.001	-0.1	2.8	0.039	15573	280632	0.003	-2710	2970
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163
NO.06 NEWSPRINT MILL	0.048	5.8	13.6	0.111	48438	219130	0.065	-6856	14368
NO.07 WRITING PAPER MILL	0.102	11.4	26.5	0.208	101857	564462	0.149	-15685	33291
NO.08 CORRUGATED PAPER	0.211	116.1	250.9	0.377	707000	2193616	0.321	-113870	266928
NO.09 BOX BOARD	0.207	32.1	68.7	0.360	207222	664855	0.312	-30850	72877
NO.10 CHLORINE	0.060	39.9	35.8	0.113	281096	983310	0.054	-3331	38821
NO.11 ALUMINA	-0.058	-6.5	4.9	0.078	34423	182904	-0.049	-9555	5249
NO.12 LOW DENS. POLYETHYL	-0.009	-1.6	5.2	0.022	13996	270809	-0.001	-5827	5618
NO.13 HI DENS. POLYETHYL	0.003	0.3	1.9	0.077	21751	152558	0.003	-1788	2036
NO.14 POLYVINYL CHLORIDE	-0.014	-1.6	5.1	0.074	31276	332853	-0.006	-6081	5479
NO.15 STYRENE-BUT. RUB.	0.046	0.9	2.1	0.136	9832	106699	0.059	-1376	2235
NO.16 NYLON	-0.014	-0.4	1.4	0.041	4322	90865	0.000	-1552	1551
NO.17 STYRENE	0.023	4.8	32.2	0.148	100548	780691	0.052	-27264	34447
NO.18 ETHYLENE	0.008	9.8	15.1	0.378	1533441	1272767	-0.013	-26150	15493
NO.19 PETROLEUM REFINING	0.005	20.7	59.4	0.359	5299956	3642579	-0.013	-102406	63533
NO.20 TYPES	0.011	1.2	4.2	0.129	52120	377385	0.011	-3411	4529
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814
NO.24 GRAY IRON FOUNDRY	-0.011	-1.7	2.5	0.171	95238	188728	-0.018	-5150	2715
NO.25 COOPER	0.012	2.0	5.8	0.133	73106	450748	0.008	-5126	6257
NO.26 MOTOR VEHICLE	0.010	2.1	6.7	0.073	55625	559622	0.010	-5569	7128
TOTAL -- ALL	0.000	256	1179	0.000	6698793	15714702	0.000	3951316	1264700
FUEL SAVINGS CASES ONLY	0.000	267	578	0.000	6501979	14367913	0.000	-375044	621143
COST SAVINGS CASES ONLY	0.000	254	595	0.000	8718016	15417605	0.000	-403599	640087
EMISSIONS SAVINGS CASE ONLY	0.000	0	579	0.000	0	0	0.000	4357236	619977
FUEL & COST SAVINGS CASES	0.000	266	574	0.000	6523201	14070816	0.000	-372524	616506
FUEL, COST & EMISSIONS SAVING	0.000	0	0	0.000	0	0	0.000	0	0

YEAR : 1990
 1.0. 8 ADVANCED TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL(AFB)
 NATIONAL SUMMARY
 *** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	1047	3709	29773680	59427248	6650684	4026087	10676783
FUEL SAVINGS CASES ONLY	1135	2431	28966848	53370496	-1523350	2712798	1189254
COST SAVINGS CASES ONLY	1044	2590	29314352	56657792	-1696480	2828823	1132353
EMISSIONS SAVINGS CASE ONLY	0	1110	0	0	8351995	1183378	9540373
FUEL & COST SAVINGS CASES	1132	2473	29007536	52801009	-1518720	2703910	1185196
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU				TOTAL	
	NATURAL GAS	PETROLEUM DISTILLATE FUEL	PETROLEUM BOILER FUEL	COAL DISTILLATE FUEL	OTHER SAVINGS	FUEL
TOTAL -- ALL	14654	-425	6082	0	-12557	1047
FUEL SAVINGS CASES ONLY	12482	-17	5013	0	-17759	1135
COST SAVINGS CASES ONLY	13173	-425	5495	0	-18719	1044
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	6177	0
FUEL & COST SAVINGS CASES	12482	-17	5003	0	-17744	1132
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-12557	2197	1047
FUEL SAVINGS CASES ONLY	12482	-17	5013	0	-17759	1416	1135
COST SAVINGS CASES ONLY	13173	-425	5495	0	-18719	1520	1044
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	6177	664	0
FUEL & COST SAVINGS CASES	12482	-17	5003	0	-17744	1403	1132
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	-12557	2197	1047
FUEL SAVINGS CASES ONLY	12482	-17	5013	0	-17759	1416	1135
COST SAVINGS CASES ONLY	13173	-425	5495	0	-18719	1520	1044
EMISSIONS SAVINGS CASE ONLY	1481	0	582	0	6177	664	0
FUEL & COST SAVINGS CASES	12482	-17	5003	0	-17744	1403	1132
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

FCR-1333

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 9 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL DER. DIST.

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS	COST SAVINGS		CAPITAL COST \$000	EMISSIONS SAVINGS		
	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	PLANT	UTILITY	TOTAL
TOTAL -- ALL	6703	14506		-5937159		69816416	11668464	16350975	28029424
FUEL SAVINGS CASES ONLY	6703	11633		-5937159		69316416	-9069417	13192606	4123179
COST SAVINGS CASES ONLY	1932	3299		1015056		17839568	-2354100	3518163	1164065
EMISSIONS SAVINGS CASE ONLY	0	2973		0		0	20737872	3168372	23906255
FUEL & COST SAVINGS CASES	1962	3299		1015056		17839568	-2354100	3518163	1164065
FUEL, COST & EMISSION SAVING	0	0		0		0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	PETROLEUM	BOILER FUEL	DISTILLATE	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14729	-409	0	-8363	-96	21366	2197	6703
FUEL SAVINGS CASES ONLY	1629	-409	0	-8363	-96	12570	180	6703
COST SAVINGS CASES ONLY	418	0	0	-2332	-96	3631	91	1962
EMISSIONS SAVINGS CASE ONLY	13140	0	0	0	0	8796	2017	0
FUEL & COST SAVINGS CASES	418	0	0	-2332	-96	3631	91	1962
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	13140	0	4891	0	0	12728	2197	4112
FUEL SAVINGS CASES ONLY	0	0	0	0	0	3932	180	4112
COST SAVINGS CASES ONLY	0	0	0	0	0	1117	91	1208
EMISSIONS SAVINGS CASE ONLY	13140	0	4891	0	0	8796	2017	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	1117	91	1208
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	13140	0	4891	0	0	12728	2197	4112
FUEL SAVINGS CASES ONLY	0	0	0	0	0	3932	180	4112
COST SAVINGS CASES ONLY	0	0	0	0	0	1117	91	1208
EMISSIONS SAVINGS CASE ONLY	13140	0	4891	0	0	8796	2017	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	1117	91	1208
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL																		
INDUSTRY	NO.10 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL DERIVED BOILER GRD				*** STRATEGY MATCH-T				EMISSIONS SAVINGS				01 ECS SIZE (M3)					
	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY TOTAL SAVINGS	COST DOLLARS \$000	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT SAVINGS \$000	EMISSIONS SAVINGS RATIO	PLANT SAVINGS \$000	EMISSIONS SAVINGS RATIO	PLANT SAVINGS \$000		EMISSIONS SAVINGS RATIO				
NO.01 MEAT PACKING	0.375	77.1	148.9	-0.383	-149145	2620531	-0.490	-255555	159281	-96275	13.20	-255555	159281	-96275	13.20	-255555	13.20	
NO.02 BAKING	0.244	15.1	37.9	-0.456	-69359	740687	-0.593	-68463	40570	-27893	0.32*	-68463	40570	-27893	0.32*	-68463	0.32*	
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	35301	20256	55558	0.00	35301	20256	55558	0.00	35301	0.00	
NO.04 WOVEN FABRIC MILL	0.195	102.4	494.5	-2.236	-886924	5751902	-0.792	-963312	529134	-434178	11.35	-963312	529134	-434178	11.35	-963312	11.35	
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00	14469	98163	112632	0.00	14469	0.00	
NO.06 NEWSPRINT MILL	0.314	48.4	125.5	0.002	967	1083670	-0.602	-223806	132204	-91602	25.87	-223806	132204	-91602	25.87	-223806	25.87	
NO.07 WRITING PAPER MILL	0.321	86.8	217.9	-0.321	-157088	2271406	-0.590	-461523	274059	-187464	25.37	-461523	274059	-187464	25.37	-461523	25.37	
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00	210628	218524	429152	0.00	210628	0.00	
NO.09 BOX BOARD	0.331	133.5	320.9	-0.333	-191788	2781637	-0.575	-569001	340320	-228673	26.98	-569001	340320	-228673	26.98	-569001	26.98	
NO.10 CHLORINE	0.234	414.2	1602.2	-0.710	-1761774	14144915	-0.735	-3101019	1736045	-1364974	27.57	-3101019	1736045	-1364974	27.57	-3101019	27.57	
NO.11 ALUMINA	0.300	0.0	32.0	0.000	0	0	0.000	53194	34273	87467	0.00	53194	34273	87467	0.00	53194	0.00	
NO.12 LOW DENS. POLYETHYL	0.202	89.5	411.6	-0.771	-492923	3689467	-0.783	-800027	440672	-359355	24.12	-800027	440672	-359355	24.12	-800027	24.12	
NO.13 HI DENS. POLYETHYL	0.196	65.1	410.9	-2.255	-633199	3591834	-0.792	-801431	440166	-361265	27.20	-801431	440166	-361265	27.20	-801431	27.20	
NO.14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0	0	0.000	29079	78782	107861	0.00	29079	78782	107861	0.00	29079	0.00	
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00	10056	4463	14519	0.00	10056	0.00	
NO.16 NYLON	0.201	27.7	129.8	-1.823	-194306	1163048	-0.783	-252866	139231	-113635	24.43	-252866	139231	-113635	24.43	-252866	24.43	
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00	104155	7532	111687	0.00	104155	0.00	
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00	780461	16628	797088	0.00	780461	0.00	
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00	2670494	313958	2984452	0.00	2670494	0.00	
NO.20 TILES	0.000	0.0	55.8	0.000	0	0	0.000	37757	59693	97450	0.00	37757	59693	97450	0.00	37757	0.00	
NO.23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	521814	4864582	0.00	4342768	521814	4864582	0.00	4342768	0.00	
NO.24 GRAY IRON FOUNDRY	0.153	23.7	49.5	0.035	19363	512581	-0.264	-88776	52914	-35863	9.84	-88776	52914	-35863	9.84	-88776	9.84	
NO.25 COPPER	0.000	0.0	82.6	0.000	0	0	0.000	54050	68446	142496	0.00	54050	68446	142496	0.00	54050	0.00	
NO.26 MOTOR VEHICLE	0.000	0.0	93.9	0.000	0	0	0.000	59750	100465	160215	0.00	59750	100465	160215	0.00	59750	0.00	

TOTAL -- ALL		1103	5412		-4516173	39365632			816390	5847591	6663986		816390	5847591	6663986		816390	
FUEL SAVINGS CASES ONLY		1103	3950		-4516173	39365632			-7585775	4284598	-3301175		-7585775	4284598	-3301175		-7585775	
COST SAVINGS CASES ONLY		72	175		20330	1601251			-312593	185118	-127465		-312593	185118	-127465		-312593	
EMISSIONS SAVINGS CASES ONLY		0	1462		0	0			8402160	1582496	9865159		8402160	1582496	9865159		8402160	
FUEL & COST SAVINGS CASES		72	175		20330	1601251			-312593	185118	-127465		-312593	185118	-127465		-312593	
FUEL & COST & EMISSIONS SAVINGS		0	0		0	0			0	0	0		0	0	0		0	

INDUSTRY	CUMULATIVE SUPPLY - PROCESS LEVEL				NO. 11 ADVANCED TECHNOLOGY (FUEL, LOW SPEED, COAL (PULVERIZED))				SAVINGS				*** STRATEGY MATCH-T				EMISSIONS SAVINGS				ECS	
	SAVINGS RATIO	FUEL SAVINGS	FUEL TOTAL	UTILITY SAVINGS	UTILITY RATIO	COST	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO
NO. 01 MEAT PACKING	0.366	73.0	142.4	0.025	0.025	9929	2872580	-0.552	-256872	152294	-104578	12.60	2872580	-0.552	-256872	152294	-104578	12.60	2872580	-0.552	-256872	152294
NO. 02 BAKING	0.209	15.4	54.8	-0.491	-0.491	-70065	1247913	-0.754	-107801	58651	-49150	0.67*	1247913	-0.754	-107801	58651	-49150	0.67*	1247913	-0.754	-107801	58651
NO. 03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0.000	0	0	0.000	35301	20256	55558	0.00	0	0.000	35301	20256	55558	0.00	0	0.000	35301	20256
NO. 04 WOODEN PAPER MILL	0.100	64.7	441.5	-0.752	-0.752	-299176	5961968	-0.675	-902667	472465	-430202	10.12	5961968	-0.675	-902667	472465	-430202	10.12	5961968	-0.675	-902667	472465
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0.000	0	0	0.000	14469	99163	112632	0.00	0	0.000	14469	99163	112632	0.00	0	0.000	14469	99163
NO. 06 NEWSPOINT MILL	0.262	50.4	163.5	0.271	0.271	118067	1522607	-0.742	-314659	172120	-142539	26.27	1522607	-0.742	-314659	172120	-142539	26.27	1522607	-0.742	-314659	172120
NO. 07 WRITING PAPER MILL	0.258	94.2	315.3	0.117	0.117	57339	3521862	-0.752	-727680	396558	-331122	26.31	3521862	-0.752	-727680	396558	-331122	26.31	3521862	-0.752	-727680	396558
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0.000	0	0	0.000	210628	216524	429152	0.00	0	0.000	210628	216524	429152	0.00	0	0.000	210628	216524
NO. 09 EOK BOARD	0.000	0.0	72.5	0.000	0.000	0	0	0.000	57664	76864	134528	0.00	0	0.000	57664	76864	134528	0.00	0	0.000	57664	76864
NO. 10 CHLORINE	0.223	357.1	1432.6	0.120	0.120	298930	13546644	-0.809	-2985986	1552243	-1353743	27.35	13546644	-0.809	-2985986	1552243	-1353743	27.35	13546644	-0.809	-2985986	1552243
NO. 11 ALUMINA	0.000	0.0	32.0	0.000	0.000	0	0	0.000	53194	34273	87467	0.00	0	0.000	53194	34273	87467	0.00	0	0.000	53194	34273
NO. 12 LOW DENS. POLYETHYL	0.167	73.8	367.9	0.030	0.030	19015	3650114	-0.665	-750029	393741	-356289	21.53	3650114	-0.665	-750029	393741	-356289	21.53	3650114	-0.665	-750029	393741
NO. 13 HI DENS. POLYETHYL	0.181	70.5	367.6	-0.427	-0.427	-119839	3534478	-0.675	-752532	393817	-358715	24.31	3534478	-0.675	-752532	393817	-358715	24.31	3534478	-0.675	-752532	393817
NO. 14 POLYVINYL CHLORIDE	0.181	129.7	670.7	-0.616	-0.616	-260349	6504558	-0.675	-1370595	717288	-653307	23.17	6504558	-0.675	-1370595	717288	-653307	23.17	6504558	-0.675	-1370595	717288
NO. 15 STYRENE-PUT. RUB.	0.000	0.0	4.2	0.000	0.000	0	0	0.000	10056	4463	14519	0.00	0	0.000	10056	4463	14519	0.00	0	0.000	10056	4463
NO. 16 NITRO	0.106	23.0	116.0	-0.333	-0.333	-35446	1179204	-0.865	-237092	124414	-112677	21.81	1179204	-0.865	-237092	124414	-112677	21.81	1179204	-0.865	-237092	124414
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0.000	0	0	0.000	104155	7532	111687	0.00	0	0.000	104155	7532	111687	0.00	0	0.000	104155	7532
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0.000	0	0	0.000	788461	16628	797095	0.00	0	0.000	788461	16628	797095	0.00	0	0.000	788461	16628
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0.000	0	0	0.000	2678494	313958	2984452	0.00	0	0.000	2678494	313958	2984452	0.00	0	0.000	2678494	313958
NO. 20 TILES	0.000	0.0	55.8	0.000	0.000	0	0	0.000	37757	59693	97450	0.00	0	0.000	37757	59693	97450	0.00	0	0.000	37757	59693
NO. 23 INTEGRATED STEEL	0.000	0.0	467.4	0.000	0.000	0	0	0.000	4342768	521814	4864582	0.00	0	0.000	4342768	521814	4864582	0.00	0	0.000	4342768	521814
NO. 24 GRAY IRON FOUNDRY	0.145	22.5	49.7	0.131	0.131	72810	587540	-0.296	-92214	52100	-40114	9.67	587540	-0.296	-92214	52100	-40114	9.67	587540	-0.296	-92214	52100
NO. 25 COFFEE	0.000	0.0	82.6	0.000	0.000	0	0	0.000	54050	89446	142496	0.00	0	0.000	54050	89446	142496	0.00	0	0.000	54050	89446
NO. 26 MOTOR VEHICLE	0.000	0.0	93.8	0.000	0.000	0	0	0.000	59750	100465	160215	0.00	0	0.000	59750	100465	160215	0.00	0	0.000	59750	100465
TOTAL AT ALL		994	5532				44129440		12626	6046764	6059395		44129440		12626	6046764	6059395		44129440		12626	6046764
FUEL SAVINGS CASES ONLY		671	4121				44129440		-8419123	4485289	-3932433		44129440		-8419123	4485289	-3932433		44129440		-8419123	4485289
COST SAVINGS CASES ONLY		671	2470				25701360		-5047439	2714055	-2328393		25701360		-5047439	2714055	-2328393		25701360		-5047439	2714055
EMISSIONS SAVINGS CASES ONLY		671	1401				0		6430745	1561279	9991825		0		6430745	1561279	9991825		0		6430745	1561279
FUEL & COST SAVINGS CASES		671	2470				25701360		-5047439	2714055	-2328393		25701360		-5047439	2714055	-2328393		25701360		-5047439	2714055
EMISSIONS & EMISSIONS SAVINGS		0	0				0		0	0	0		0		0	0	0		0		0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 11 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL (POLYMERIZED)

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL		UTILITY		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10-12 BTU	10-12 BTU	FUEL	SAVINGS	DOLLARS	\$000	\$000	PLANT	TONS PER YEAR	TOTAL
TOTAL -- ALL	4755	22302			832251	197446336		-17958816	25270096	7311215
FUEL SAVINGS CASES ONLY	4755	16441			832251	197446336		-17958816	2100432	-18418640
COST SAVINGS CASES ONLY	3504	12540			3532944	130285569		-26438976	14299407	-12139574
EMISSIONS CASES ONLY	0	3311			0	0		21604176	4065675	25729340
FUEL & COST SAVINGS CASES	3504	12540			3532944	130285569		-26438976	14299407	-12139574
FUEL, COST & EMISSION SAVING	0	0			0	0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

	FUEL SAVINGS		10-12 BTU		COAL DERIVED		TOTAL FUEL		
	NATURAL GAS	PETROLEUM	DISTILLATE	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14359	0	0	0	0	0	0	12867	2197
FUEL SAVINGS CASES ONLY	14359	0	0	0	0	0	0	12867	2197
COST SAVINGS CASES ONLY	13442	0	0	0	0	0	0	12867	144
EMISSIONS CASES ONLY	633	0	0	0	0	0	0	0	95
FUEL & COST SAVINGS CASES	13442	0	0	0	0	0	0	12867	2052
FUEL, COST & EMISSION SAVING	633	0	0	0	0	0	0	0	95

SITE PLUS UTILITY

FUEL COST & EMISSION SAVING										
TOTAL -- ALL	14359	0	0	0	0	0	0	12867	2197	4755
FUEL SAVINGS CASES ONLY	14359	0	0	0	0	0	0	12867	144	4755
COST SAVINGS CASES ONLY	13442	0	0	0	0	0	0	1226	95	3504
EMISSIONS CASES ONLY	633	0	0	0	0	0	0	0	2052	0
FUEL & COST SAVINGS CASES	13442	0	0	0	0	0	0	1226	95	3504
FUEL, COST & EMISSION SAVING	633	0	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION										
TOTAL -- ALL	14359	0	0	0	0	0	0	14122	2197	5131
FUEL SAVINGS CASES ONLY	14359	0	0	0	0	0	0	14122	144	5131
COST SAVINGS CASES ONLY	13442	0	0	0	0	0	0	13462	95	3874
EMISSIONS CASES ONLY	633	0	0	0	0	0	0	9719	2052	0
FUEL & COST SAVINGS CASES	13442	0	0	0	0	0	0	13462	95	3874
FUEL, COST & EMISSION SAVING	633	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

100% COAL FUEL CONVERSION										
TOTAL - ALL	14359	0	5553	0	0	0	0	14122	2197	5131
FUEL SAVINGS CASES ONLY	14359	0	5553	0	0	0	0	14122	144	5131
COST SAVINGS CASES ONLY	633	0	165	0	0	0	0	740	95	387
EMISSIONS CASES ONLY	13442	0	5388	0	0	0	0	3662	2052	0
FUEL & COST SAVINGS CASES	133	0	65	0	0	0	0	9715	95	397
FUEL, COST & EMISSIONS SAVING	0	0	0	0	0	0	0	3462	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-T				EMISSIONS SAVINGS				01	
NO.12 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETR. BOILER GRD										CAPITAL COST \$000		EMISSIONS RATIO		SAVINGS \$000		TOTAL		ECS SIZE (FW)	
INDUSTRY										FUEL ENERGY TOTAL		UTILITY COST \$000		SAVINGS \$000		TOTAL		ECS SIZE (FW)	
										SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		TOTAL		ECS SIZE (FW)	
NO.01 MEAT PACKING	0.364	56.7	99.7	0.143	55735	55735	0.552	541944	0.552	-28357	105567	76710	8.73						
NO.02 BAKING	0.185	7.4	13.4	-0.029	-4076	-4076	0.451	155677	0.451	-4121	14325	10204	0.11*						
NO.03 MALT BEVERAGE	0.368	53.4	92.6	0.120	31600	31600	0.553	329025	0.553	-26823	99060	72237	5.11						
NO.04 WOVEN FABRIC MILL	0.202	21.8	42.7	0.105	41518	41518	0.312	278444	0.312	-14327	45717	31390	0.96*						
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	12986	0.000	93163	111149	0.00							
NO.06 NEWSPRINT MILL	0.258	31.0	58.2	0.191	83141	83141	0.378	166699	0.378	-18133	61296	43163	41.56						
NO.07 WRITING PAPER MILL	0.373	56.3	98.6	0.243	118762	118762	0.553	337662	0.553	-33770	124062	90292	28.42						
NO.08 CORRUGATED PAPER	0.373	323.2	566.7	0.208	390763	390763	0.553	1417484	0.553	-165131	602885	437755	79.27						
NO.09 BOX BOARD	0.372	63.8	156.4	0.225	129180	129180	0.552	410306	0.552	-45679	165863	120184	78.19						
NO.10 CHLORINE	0.287	192.0	269.9	0.228	566745	566745	0.364	761599	0.364	-56208	292440	236232	22.84						
NO.11 ALUMINA	0.258	43.6	89.9	0.074	32566	32566	0.441	218011	0.441	-31537	96268	64730	41.67						
NO.12 LOW DENS. POLYETHYL	0.159	27.8	49.9	0.114	73182	73182	0.218	166643	0.218	-15127	53425	38298	5.75						
NO.13 HI DENS. POLYETHYL	0.320	24.4	44.1	0.231	64961	64961	0.470	133068	0.470	-13446	47196	33750	7.17						
NO.14 POLYVINYL CHLORIDE	0.366	44.6	60.3	0.257	106593	106593	0.549	254627	0.549	-24408	85889	61479	6.83						
NO.15 STYRENE-BUT. RUB.	0.340	12.0	20.6	0.103	7430	7430	0.513	71216	0.513	-6039	22147	16109	7.37						
NO.16 NYLON	0.257	7.4	13.2	0.177	18850	18850	0.372	55210	0.372	-3973	14178	10205	2.44						
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	93480	0.000	7532	101012	0.00							
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	700469	0.000	16628	717096	0.00							
NO.19 PETROLEUM REFINING	0.271	1539.8	1836.4	0.126	1851324	1851324	0.385	7226882	0.385	-317532	2019194	1701662	77.03						
NO.20 TIRES	0.374	57.5	100.1	0.224	90567	90567	0.554	335555	0.554	-29054	107103	78049	10.77						
NO.23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	0.000	521814	4864582	0.00							
NO.24 GPAY IPON FOUNDRY	0.203	32.2	47.4	0.146	81472	81472	0.299	153367	0.299	-11894	50718	36824	9.36						
NO.25 COPPER	0.375	83.2	144.6	0.229	134148	134148	0.552	431314	0.552	-42487	154750	114263	8.62						
NO.26 MOTOR VEHICLE	0.334	91.4	158.8	0.156	118326	118326	0.553	557114	0.553	-46310	170025	123715	15.36						
TOTAL -- ALL	2794	4635	3994784	1400800	4214646	4976237	9191086												
FUEL SAVINGS CASES ONLY	2794	4635	3994784	1400800	4214646	4976237	9191086												
COST SAVINGS CASES ONLY	2794	4635	3994784	1400800	4214646	4976237	9191086												
EMISSIONS SAVINGS CASE ONLY	2794	4635	3994784	1400800	4214646	4976237	9191086												
FUEL & COST SAVINGS CASES	2794	4635	3994784	1400800	4214646	4976237	9191086												
FUEL, COST & EMISSION SAVING	2794	4635	3994784	1400800	4214646	4976237	9191086												

YEAR : 1990
 NO.12 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,PETR. BOILER GRD
 NATIONAL SUMMARY
 *** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	PLANT UTILITY	TOTAL
TOTAL -- ALL	8176	14055	12699293	41567936	10439919	15317799	25757712
FUEL SAVINGS CASES ONLY	8176	12831	12699293	41567936	-3403310	13980251	10576933
COST SAVINGS CASES ONLY	8162	12805	12707094	41269536	-3395411	13952792	10557373
EMISSIONS SAVINGS CASE ONLY	0	1254	0	0	13843237	1337551	15180789
FUEL & COST SAVINGS CASES	8162	12805	12707094	41269536	-3395411	13952792	10557373
FUEL,COST & EMISSION SAVINGS	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM DISTILLATE	FUEL SAVINGS	COILER FUEL	PETROLEUM DISTILLATE	COILER FUEL	GAS	DISTILLATE	COILER FUEL	COAL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14768	-425	-10795	0	0	0	0	0	0	20646	2197	8176
FUEL SAVINGS CASES ONLY	6006	-425	-13376	0	0	0	0	0	0	14272	1501	8176
COST SAVINGS CASES ONLY	6006	-425	-13354	0	0	0	0	0	0	14246	1489	8162
EMISSIONS SAVINGS CASE ONLY	8583	0	2584	0	0	0	0	0	0	6374	696	0
FUEL & COST SAVINGS CASES	6006	-425	-13354	0	0	0	0	0	0	14246	1489	8162
FUEL,COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14768	-425	-10795	0	0	0	0	0	0	20646	2197	8176
FUEL SAVINGS CASES ONLY	6006	-425	-13376	0	0	0	0	0	0	14272	1501	8176
COST SAVINGS CASES ONLY	6006	-425	-13354	0	0	0	0	0	0	14246	1489	8162
EMISSIONS SAVINGS CASE ONLY	8583	0	2584	0	0	0	0	0	0	6374	696	0
FUEL & COST SAVINGS CASES	6006	-425	-13354	0	0	0	0	0	0	14246	1489	8162
FUEL,COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										** STRATEGY MATCH-T				EMISSIONS SAVINGS		ECS	
NO.13 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL DER. BLR 670										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT UTILITY		TOTAL	
INDUSTRY	FUEL SAVINGS RATIO	ENERGY TOTAL	FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO
NO.01 MEAT PACKING	0.364	56.7	98.7	0.145	56435	0.520	-31219	105567	74348	8.73							
NO.02 BAKING	0.185	7.4	13.4	-0.038	-4032	0.424	-4443	14325	9883	0.11*							
NO.03 MALT BEVERAGE	0.368	53.4	92.6	0.121	31951	0.521	-29011	99060	70049	5.11							
NO.04 KOVEN FABRIC MILL	0.202	21.0	42.7	0.105	41652	0.295	-15491	45717	30226	0.96*							
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	14469	98163	112632	0.00							
NO.06 NEWSPRINT MILL	0.258	31.0	59.2	0.191	83357	0.358	-19665	61296	41631	41.56							
NO.07 WRITING PAPER MILL	0.373	56.3	98.6	0.243	119198	0.522	-36536	124062	87526	28.42							
NO.08 CORRUGATED PAPER	0.373	323.2	566.7	0.210	393643	0.521	-178689	602885	424196	79.27							
NO.09 BOX BOARD	0.372	88.8	156.4	0.226	129972	0.521	-49438	165863	116426	78.19							
NO.10 CHLORINE	0.287	192.0	269.9	0.229	567775	0.351	-60169	292440	232271	22.84							
NO.11 ALUMINA	0.258	43.6	89.9	0.074	32903	0.415	-34295	96268	61972	41.67							
NO.12 LOW DENS. POLYETHYL	0.159	27.8	49.9	0.115	73370	0.209	-16385	53425	37041	5.75							
NO.13 HI DENS. POLYETHYL	0.320	24.4	44.1	0.232	65127	0.444	-14566	47196	32630	7.17							
NO.14 POLYVINYL CHLORIDE	0.366	44.6	80.3	0.258	108896	0.517	-26440	85888	59448	6.83							
NO.15 STYRENE-BUT. RUB.	0.340	12.0	20.6	0.104	7517	0.485	-6533	22147	15614	7.37							
NO.16 NYLON	0.357	7.4	13.2	0.177	18900	0.353	-4289	14178	9839	2.44							
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	104155	7532	111687	0.00							
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	780461	16628	797088	0.00							
NO.19 PETROLEUM REFINING	0.274	1555.0	1873.1	0.132	1944287	0.366	-291911	2004935	1713025	76.48							
NO.20 TIRES	0.374	57.5	100.1	0.225	91015	0.522	-31430	107103	75673	10.77							
NO.23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0.000	4342768	521814	4864582	0.00							
NO.24 GRAY IRON FOUNDRY	0.208	32.2	47.0	0.147	81778	0.278	-12505	50266	37761	9.28							
NO.25 COPPER	0.375	83.2	144.6	0.229	134693	0.521	-45977	154750	108773	8.62							
NO.26 MOTOR VEHICLE	0.334	91.4	158.8	0.157	119104	0.522	-50103	170025	119922	15.36							
TOTAL -- ALL		2810	4621		4097536		4282756	4961526	9244286								
FUEL SAVINGS CASES ONLY		2610	4019		4097536		-959095	4317391	3356297								
COST SAVINGS CASES ONLY		2802	4006		4101569		-954652	4303066	3348414								
EMISSIONS SAVINGS CASE ONLY		0	602		0		5241852	644137	585939								
FUEL & COST SAVINGS CASES		2602	4016		4101569		-954652	4303066	3348414								
FUEL, COST & EMISSIONS SAVING		2802	4016		4101569		0	0	0								

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.13 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL DER.BLR CRD

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL		UTILITY	COST SAVINGS	CAPITAL	EMISSIONS SAVINGS		
	FUEL	SAVINGS	FUEL	DOLLARS	COST	PLANT	UTILITY	TOTAL
10**12 BTU 10**12 BTU								

TOTAL -- ALL	8207	14059		12918357	40964784	10889539	15289603	26179136
FUEL SAVINGS CASES ONLY	8207	12505		12918357	40964784	-3503944	13952054	10358104
COST SAVINGS CASES ONLY	8193	12779		12926055	40667200	-3575430	13924596	10349160
EMISSIONS SAVINGS CASE ONLY	0	1254		0	0	14473494	1337551	15811046
FUEL & COST SAVINGS CASES	8193	12779		12926055	40667200	-3575430	13924596	10349160
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU -----				TOTAL	
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	COAL DISTILLATE	OTHER SAVINGS	FUEL

SITE PLUS UTILITY

TOTAL -- ALL	14768	-425	6082	0	0	-16819	20619	2197	8207
FUEL SAVINGS CASES ONLY	6205	-425	3499	0	0	-16819	14245	1501	8207
COST SAVINGS CASES ONLY	6205	-425	3493	0	0	-16790	14220	1489	8193
EMISSIONS SAVINGS CASE ONLY	8583	0	2504	0	0	0	6374	686	0
FUEL & COST SAVINGS CASES	6205	-425	3493	0	0	-16790	14220	1489	8193
FUEL,COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	6563	0	2584	0	0	0	9848	2197	4976
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	3474	1501	4976
COST SAVINGS CASES ONLY	0	0	0	0	0	0	3483	1489	4972
EMISSIONS SAVINGS CASE ONLY	6563	0	2584	0	0	0	6374	686	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	3483	1489	4972
FUEL,COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL													*** STRATEGY MATCH-T		EMISSIONS SAVINGS		01
INDUSTRY	NO.14 ADVANCED TECHNOLOGY,GAS TURLINE,DIRECT FIRED,COAL GASIFIER										CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	---- TONS PER YEAR ----		ECS SIZE (MM)		
	FUEL ENERGY TOTAL					SAVINGS							PLANT	UTILITY		TOTAL	
	SAVINGS RATIO	FUEL SAVINGS	UTILITY SAVINGS	COST DOLLARS \$000	SAVINGS DOLLARS \$000	SAVINGS RATIO	FUEL SAVINGS	UTILITY SAVINGS	COST DOLLARS \$000	SAVINGS DOLLARS \$000							
NO.01 MEAT PACKING	0.205	21.5	49.0	0.081	31610	1576039	0.397	-16106	51337	35231	4.21*						
NO.02 EATING	0.097	3.9	8.1	-0.101	-14425	346905	0.264	-2493	8647	6154	0.07*						
NO.03 MALT BEVERAGE	0.225	21.5	43.3	0.192	50470	917747	0.410	-12824	46279	33455	2.37*						
NO.04 KOVEN FAERIC MILL	0.095	10.2	26.3	0.019	7455	896442	0.179	-9833	28197	18363	0.59*						
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00						
NO.06 NEWSPRINT MILL	0.119	14.3	27.3	0.165	71932	382820	0.183	-7476	28726	21250	19.19						
NO.07 WPTING PAPER MILL	0.204	22.8	46.4	0.302	147664	605104	0.357	-16224	58303	42079	13.16						
NO.09 CORRUGATED PAPER	0.231	130.6	266.2	0.364	683676	3240791	0.412	-79630	283163	203533	55.03						
NO.09 BOX BOARD	0.228	35.6	73.4	0.360	287178	936094	0.411	-22159	77783	55625	36.13						
NO.10 CHLORIDE	0.144	96.6	121.0	0.180	446540	1816571	0.181	-11352	131117	119766	10.09						
NO.11 ALUMINA	0.106	12.9	42.4	0.167	73910	555334	0.271	-18737	45444	26707	19.31						
NO.12 LOW DENS. POLYETHYL	0.062	10.8	23.3	0.074	47264	456673	0.098	-7591	24986	17396	2.65*						
NO.13 HI DENS. POLYETHYL	0.112	8.6	21.8	0.149	41819	394220	0.207	-8144	23348	15203	3.50*						
NO.14 POLYVINYL CHLORIDE	0.131	15.1	40.6	0.176	74428	736335	0.257	-15733	43416	27683	3.41*						
NO.15 STYRENE-BUT. RUB.	0.204	5.0	9.7	0.171	12376	194864	0.365	-2929	10399	7470	3.41*						
NO.16 NYLON	0.122	3.5	7.3	0.121	12875	170353	0.200	-2221	7829	5608	1.33*						
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00						
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797083	0.00						
NO.19 PETROLEUM REFINING	0.262	1704.4	2721.1	0.354	5655854	33908224	0.422	-554474	2912674	2358201	83.30						
NO.20 TIRES	0.212	23.2	47.1	0.246	99814	951463	0.372	-14102	50401	36299	4.99*						
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864592	0.00						
NO.24 GRAY IRON FOUNDRY	0.082	12.7	26.4	0.093	51805	469716	0.138	-9474	28219	18745	5.21						
NO.25 COPPER	0.210	33.7	67.9	0.265	155950	1206143	0.364	-20833	72687	51654	4.00*						
NO.26 MOTOR VEHICLE	0.170	35.4	77.1	0.162	122577	1555961	0.357	-25303	82565	57263	7.36						
TOTAL -- ALL													4384216	4659652	9043870		
FUEL SAVINGS CASES ONLY													-857636	4015515	3157820		
COST SAVINGS CASES ONLY													-855143	4002269	3151726		
EMISSIONS SAVINGS CASE ONLY													5241852	644137	5365939		
FUEL & COST SAVINGS CASES													-355143	4006669	3151726		
FUEL,COST & EMISSIONS SAVING													0	0	0		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.14 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL GASIFIER

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	UTILITY	\$000	\$000
TOTAL -- ALL	5377	10940			21440752	134512064			12026342	11713595	23739936	
FUEL SAVINGS CASES ONLY	5377	9556			21440752	134512064			-2447143	10376047	7928899	
COST SAVINGS CASES ONLY	5369	9570			21468400	133847120			-2442365	10355472	7917105	
EMISSIONS SAVINGS CASE ONLY	0	1234			0	0			14473494	1337551	15811046	
FUEL & COST SAVINGS CASES	5369	9570			21468400	133847120			-2442365	10359472	7917105	
FUEL,COST & EMISSION SAVING	0	0			0	0			0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14768	-425	6092	0	0	-95	1065	2197
FUEL SAVINGS CASES ONLY	6006	-425	3439	0	0	-95	-5309	1501
COST SAVINGS CASES ONLY	6206	-425	3493	0	0	-95	-5299	1489
EMISSIONS SAVINGS CASE ONLY	6563	0	2534	0	0	0	6374	696
FUEL & COST SAVINGS CASES	6206	-425	3493	0	0	-95	-5299	1489
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14039	-425	5399	0	0	0	2947	2197
FUEL SAVINGS CASES ONLY	5476	-425	2815	0	0	0	-3427	1501
COST SAVINGS CASES ONLY	5477	-425	2810	0	0	0	-3417	1489
EMISSIONS SAVINGS CASE ONLY	6363	0	2534	0	0	0	6374	696
FUEL & COST SAVINGS CASES	5477	-425	2510	0	0	0	-3417	1489
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO.15 ADVANCED TECHNOLOGY GAS TURBINE/DIRECT FIRED COAL (PFB)									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST		SAVINGS		*** STRATEGY MATCH-T		01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	UTILITY SAVINGS	RATIO	DOLLARS \$000	COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS PLANT	
NO.01 MEAT PACKING	0.257	32.9	71.4	0.006	2960	1750547	0.435	-26919	49465 6.35
NO.02 BAKING	0.136	5.5	12.1	-0.112	-16006	400218	0.360	-4610	8389 0.10*
NO.03 MALT BEVERAGE	0.225	28.0	72.1	0.008	2238	1202577	0.413	-30682	46444 4.00*
NO.04 WOVEN FABRIC MILL	0.129	13.9	44.5	0.017	6797	1039318	0.257	-21279	26316 1.01*
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163 0.00
NO.06 NEWSPRINT MILL	0.170	20.4	41.7	0.189	82591	435260	0.253	-14540	29419 29.89
NO.07 WRITING PAPER MILL	0.201	35.8	75.1	0.301	147152	968262	0.453	-31935	62551 21.71
NO.08 CORRUGATED PAPER	0.282	205.7	428.4	0.312	585302	3986098	0.453	-153679	302059 90.14
NO.09 BOX BOARD	0.234	56.8	117.6	0.314	180716	1138557	0.455	-41768	82934 58.94
NO.10 CHLORINE	0.194	129.7	228.3	0.206	511296	2447811	0.268	-69949	177434 19.41
NO.11 ALUMINA	0.131	21.3	83.2	0.068	30086	799371	0.320	-43584	45543 36.80
NO.12 LOW DENS. POLYETHYL	0.074	12.9	42.8	0.071	45596	603317	0.141	-20912	24940 4.97*
NO.13 HI DENS. POLYETHYL	0.154	11.7	39.2	0.157	44191	516463	0.310	-19234	22762 6.42
NO.14 POLYVINYL CHLORIDE	0.169	21.7	68.7	0.189	79828	928732	0.377	-32835	40630 5.88
NO.15 STYRENE-BUT. RUB.	0.211	6.6	16.3	0.060	4311	236816	0.383	-6943	10544 5.84
NO.16 NYLON	0.147	4.3	13.2	0.115	12223	219392	0.284	-6235	7944 2.46*
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532 111687 0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628 797088 0.00
NO.19 FETROLEUM REFINING	0.272	1719.9	2521.2	0.324	4774323	31817296	0.398	-559766	2138970 77.99
NO.20 TIRES	0.214	31.9	95.5	0.110	44387	1364551	0.414	-44271	102170 57899 10.34
NO.23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	521814 4864582 0.00
NO.24 GRAY IRON FOUNDRY	0.083	12.9	29.4	0.217	121151	461941	0.133	-12336	30408 18072 5.65
NO.25 COPPER	0.213	34.1	69.8	0.214	125727	1229078	0.347	-25201	74646 49446 4.15*
NO.26 MOTOR VEHICLE	0.194	40.9	96.0	0.130	98551	1697479	0.395	-38501	102767 64266 9.29
TOTAL -- ALL		2447	4768		6893413	53225043		4036672	5115335 9152012
FUEL SAVINGS CASES ONLY		2447	4166		6893413	53225043		-1205177	4471200 3266023
COST SAVINGS CASES ONLY		2441	4154		6899419	52827824		-1200566	4458201 3257634
EMISSIONS SAVINGS CASE ONLY		0	602		0	0		5241852	644137 5885939
FUEL & COST SAVINGS CASES		2441	4154		6899419	52827824		-1200566	4458201 3257634
FUEL, COST & EMISSIONS SAVINGS		0	0		0	0		0	0 0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 15 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL (PFD)

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	6399	12004	18815576	146645104	10476428	14399802	24876224
FUEL SAVINGS CASES ONLY	6399	12004	18815576	146645104	-3997057	13062254	9065188
COST SAVINGS CASES ONLY	6379	12004	18649264	145977968	-3999321	13037337	9049108
EMISSIONS SAVINGS CASE ONLY	0	1254	0	0	14473494	1337551	15911046
FUEL & COST SAVINGS CASES	6379	12004	18949264	145677968	-3998221	13037337	9049108
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL	
	NATURAL GAS	PETROLEUM	COAL	OTHER	FUEL	FUEL
TOTAL -- ALL	14768	6032	0	1992	2197	6399
FUEL SAVINGS CASES ONLY	6006	3493	0	-4392	1501	6399
COST SAVINGS CASES ONLY	6006	3493	0	-4392	1489	6379
EMISSIONS SAVINGS CASE ONLY	8553	2554	0	6374	695	0
FUEL & COST SAVINGS CASES	6006	3493	0	-4392	1489	6379
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14768	-425	6032	0	1992	2197	6399
FUEL SAVINGS CASES ONLY	6006	-425	3493	0	-4392	1501	6399
COST SAVINGS CASES ONLY	6006	-425	3493	0	-4392	1489	6379
EMISSIONS SAVINGS CASE ONLY	8553	0	2554	0	6374	695	0
FUEL & COST SAVINGS CASES	6006	-425	3493	0	-4392	1489	6379
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14769	-425	6082	0	1992	2197	6399
FUEL SAVINGS CASES ONLY	6006	-425	3493	0	-4392	1501	6399
COST SAVINGS CASES ONLY	6006	-425	3493	0	-4392	1489	6379
EMISSIONS SAVINGS CASE ONLY	8553	0	2554	0	6374	695	0
FUEL & COST SAVINGS CASES	6006	-425	3493	0	-4392	1489	6379
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO. 16 ADVANCED TECHNOLOGY GAS TUBULAR FURNACE PROJECT (COAL/AFB)											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY TOTAL		SAVINGS TOTAL		FUEL ENERGY TOTAL		SAVINGS TOTAL		ECS SIZE (MM)
	SAVINGS	PATIO	SAVINGS	PATIO	SAVINGS	DOLLARS \$000	SAVINGS	PATIO	SAVINGS	DOLLARS \$000	
*** STRATEGY MATCH-T											
	CAPITAL COST \$000		EMISSIONS SAVINGS		EMISSIONS SAVINGS		EMISSIONS SAVINGS		EMISSIONS SAVINGS		ECS SIZE (MM)
	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	PLANT	UTILITY	TOTAL	SAVINGS	TOTAL	
NO. 01 MEAT PACKING	0.134	14.1	30.8	0.009	3615	1302256	0.201	-15147	32961	17814	2.91
NO. 02 BAKING	0.059	2.3	4.9	-0.129	-18434	264027	0.121	-2375	5203	2828	0.04*
NO. 03 MALT ELVERAGE	0.167	13.2	26.7	0.109	28325	845279	0.253	-12425	28600	16175	1.58*
NO. 04 NOVEN FABRIC MILL	0.065	7.0	14.6	0.009	3669	638916	0.085	-6956	15636	8680	0.35*
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00
NO. 06 HEMSPRINT MILL	0.088	10.5	16.7	0.109	47683	326312	0.102	-5795	17631	11836	12.58
NO. 07 WRITING PAPER MILL	0.170	19.0	32.2	0.215	105217	747607	0.223	-14261	40533	26272	9.73
NO. 08 CORRUGATED PAPER	0.215	103.5	186.1	0.302	567408	2956542	0.295	-71222	190010	126788	40.95
NO. 09 FCK BOARD	0.183	29.1	50.2	0.258	148328	873143	0.252	-19316	53201	33895	26.28
NO. 10 CHLORINE	0.134	89.5	94.7	0.147	364573	1729412	0.136	-12446	102603	90157	8.41
NO. 11 ALUMINA	0.074	8.2	29.8	0.129	57175	485914	0.155	-18303	31872	13569	14.39
NO. 12 LOW DENS. POLYETHYL	0.022	3.6	16.8	0.028	18212	430449	0.039	-11033	17979	6946	2.06
NO. 13 HI DENS. POLYETHYL	0.069	5.2	13.6	0.084	23517	335237	0.097	-7454	14614	7161	2.35
NO. 14 POLYVINYL CHLORIDE	0.091	9.3	24.9	0.099	41674	620021	0.120	-13645	26578	12933	2.24
NO. 15 STYRENE-UT. RUB.	0.156	3.3	6.2	0.132	9568	163074	0.227	-2870	6663	3793	2.34
NO. 16 NYLON	0.059	1.7	4.7	0.052	5586	140990	0.037	-2565	5014	2428	0.92*
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16620	797088	0.00
NO. 19 PETROLEUM REFINING	0.229	1278.1	1789.6	0.323	4761016	27525888	0.298	-546251	1914561	1368310	78.45
NO. 20 TIRES	0.151	16.5	31.3	0.152	61428	836826	0.205	-13517	33510	19993	3.55
NO. 23 INTEGRATED STEEL	0.000	0.0	437.4	0.000	0	0	0.000	4342768	521814	4864582	0.00
NO. 24 SPRAY IRON FOUNDRY	0.020	3.1	13.7	0.167	93264	384334	0.031	-10475	14699	4224	2.94
NO. 25 COPPER	0.132	21.2	45.3	0.157	92137	1075354	0.185	-22217	48524	26307	2.86
NO. 26 MOTOR VEHICLE	0.134	23.0	52.8	0.098	74367	1324029	0.211	-22754	56538	33784	5.37
TOTAL - ALL											
FUEL SAVINGS CASES ONLY											
UTILITY SAVINGS CASES ONLY											
EMISSIONS SAVINGS CASE ONLY											
FUEL & UTILITY SAVINGS											
FUEL, COST & EMISSIONS SAVING											

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

1.0.16 ADVANCED TECHNOLOGY, GAS TURBINE, INDIRECT FIRED, COAL (AFB)

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	4057	7653	16091168	114612896	12150266	8267818	20418096
FUEL SAVINGS CASES ONLY	4257	6399	16391168	114612896	-2323218	6530270	4607053
COST SAVINGS CASES ONLY	4053	6399	16926512	114068464	-2318665	6920297	4601633
EMISSIONS SAVINGS CASE ONLY	0	1254	0	0	14473494	1337551	15811046
FUEL & COST SAVINGS CASES	4053	6399	16926512	114068464	-2318665	6920297	4601633
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---			TOTAL FUEL
	NATURAL PETROLEUM GAS	DISTILLATE FUEL	COAL FUEL	
TOTAL -- ALL	14769	-425	0	14344
FUEL SAVINGS CASES ONLY	6206	-425	0	5781
COST SAVINGS CASES ONLY	6206	-425	0	5781
EMISSIONS SAVINGS CASE ONLY	8563	0	0	8563
FUEL & COST SAVINGS CASES	6206	-425	0	5781
FUEL, COST & EMISSION SAVING	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14769	-425	6082	0	0	2197	4057
FUEL SAVINGS CASES ONLY	6206	-425	3499	0	0	1501	4057
COST SAVINGS CASES ONLY	6206	-425	3493	0	0	1489	4053
EMISSIONS SAVINGS CASE ONLY	8563	0	2584	0	0	696	0
FUEL & COST SAVINGS CASES	6206	-425	3493	0	0	1489	4053
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14769	-425	6082	0	0	2197	4057
FUEL SAVINGS CASES ONLY	6206	-425	3499	0	0	1501	4057
COST SAVINGS CASES ONLY	6206	-425	3493	0	0	1489	4053
EMISSIONS SAVINGS CASE ONLY	8563	0	2584	0	0	696	0
FUEL & COST SAVINGS CASES	6206	-425	3493	0	0	1489	4053
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CLASS GENERAL SUMMARY - PROCESS LEVEL

NO. 17 ADVANCED TECHNOLOGY GAS TURBINE CLOSER CYCLE, COAL DER. B.G.

INDUSTRY	FUEL ENERGY TOTAL		SAVINGS		FUEL		SAVINGS		RATIO		DOLLARS		CAPITAL COST		EMISSIONS SAVINGS		EMISSIONS SAVINGS		TOTAL		ECS SIZE	
	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL	SAVINGS	FUEL
NO. 01 MEAT PACKING	0.150	50.5	63.3	-0.009	-3310								1226504	0.508	-24629	09100	64271	7.53				
NO. 02 BAKING	0.195	8.5	19.0	-0.361	-54354								645428	0.468	-7795	20359	12564	0.17*				
NO. 03 MILK BEVERAGE	0.285	29.0	49.7	-0.072	-18885								722313	0.423	-15808	53210	37402	2.82*				
NO. 04 WOVEN FABRIC MILL	0.230	24.8	63.8	-0.056	-22399								1027261	0.387	-28645	69310	39665	1.49*				
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0								0	0.000	14469	98163	112632	0.00				
NO. 06 NEWSPRINT MILL	0.222	26.7	58.2	0.113	49096								412486	0.331	-22826	61335	38510	42.72				
NO. 07 WRITING PAPER MILL	0.300	48.6	109.7	0.038	18439								917105	0.470	-52682	137948	85267	32.51				
NO. 08 CORRUGATED PAPER	0.311	290.6	601.6	-0.002	-4070								3834690	0.476	-235392	639952	404560	86.44				
NO. 09 PLY BOARD	0.316	77.3	161.9	0.052	30047								1056048	0.479	-61909	171690	109782	83.10				
NO. 10 CHLORINE	0.248	166.1	319.1	0.136	338208								2284312	0.348	-115554	345713	230159	27.83				
NO. 11 ALUMINA	0.191	35.9	106.6	-0.157	-69427								735554	0.370	-53560	116306	62746	52.00				
NO. 12 LOW DENS. POLYETHYL	0.134	23.4	61.9	0.039	24729								519472	0.214	-28310	66221	37911	7.37				
NO. 13 HI DENS. POLYETHYL	0.269	20.6	53.7	0.089	24860								426530	0.450	-24378	57486	33109	9.02				
NO. 14 POLYVINYL CHLORIDE	0.201	37.9	93.5	0.050	21061								749361	0.457	-41002	100023	59022	8.21				
NO. 15 STYRENE-BUT. RUB.	0.258	10.3	25.0	-0.247	-17851								203532	0.429	-11003	26804	15301	9.20				
NO. 16 NYLON	0.260	7.5	18.8	0.065	6924								181744	0.424	-8296	20166	11871	3.59*				
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0								0	0.000	104155	7532	111687	0.00				
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0								0	0.000	780461	16628	797088	0.00				
NO. 19 PETROLEUM REFINING	0.139	755.0	1671.2	-0.065	-962184								12064440	0.237	-732119	1788806	1056687	70.31				
NO. 20 TILES	0.231	49.9	120.7	-0.116	-46874								1145794	0.458	-52702	129139	76436	13.40				
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0								0	0.000	4342768	521814	4864582	0.00				
NO. 24 GRAY IRON FOUNDRY	0.019	2.9	6.7	-0.019	-10502								121936	0.018	-4607	7114	2507	1.39*				
NO. 25 COPPER	0.283	45.3	73.0	0.104	61234								923787	0.407	-25489	83469	57950	4.77*				
NO. 26 MOTOR VEHICLE	0.253	77.7	192.4	-0.137	-103740								1859728	0.457	-84596	286004	121419	19.21				
TOTAL -- ALL	1777	4499			-739317								31067248		3610362	4933264	8443648					
FUEL SAVINGS CASES ONLY	1777	3597			-739317								31067248		-1631435	4169149	2557660					
COST SAVINGS CASES ONLY	453	555			574599								7470964		-380443	1044053	663609					
EMISSIONS SAVINGS CASE ONLY	0	602			0								0		5241852	644137	5685389					
FUEL & COST SAVINGS CASES	453	455			574599								7470964		-380443	1044053	663609					
FUEL, COST & EMISSIONS SAVINGS	0	0			0								0		0	0	0					

YEAR : 1990
NO.17 ADVANCED TECHNOLOGY, GAS TURBINE, CLOSED CYCLE, COAL DER. B.G.
NATIONAL SUMMARY

07

*** STRATEGY MATCH-T

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10**12 BTU 10**12 BTU		FUEL SAVINGS		\$000		\$000		PLANT UTILITY		TOTAL	
TOTAL -- ALL	5826	14364			-811351		100872560		8881893	15647115	24528992	
FUEL SAVINGS CASES ONLY	5826	13110			-811351		100872560		-5591592	14309566	8717958	
COST SAVINGS CASES ONLY	2354	5119			2376195		39942832		-2174192	5772635	3598441	
EMISSIONS SAVINGS CASE ONLY	0	1254			0		0		14473494	1337551	15811846	
FUEL & COST SAVINGS CASES	2354	5119			2376195		39942832		-2174192	5772635	3598441	
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL PETROLEUM GAS DISTILLATE BOILER FUEL		COAL FUEL		OTHER SAVINGS	
TOTAL -- ALL	14768	-425	6082	0	-19505	20924
FUEL SAVINGS CASES ONLY	6209	-425	3499	0	-19505	14550
COST SAVINGS CASES ONLY	1045	0	770	0	-5337	5800
EMISSIONS SAVINGS CASE ONLY	8563	0	2584	0	0	6374
FUEL & COST SAVINGS CASES	1045	0	770	0	-5337	5800
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14768	-425	6082	0	-19505	20924	2197	5826
FUEL SAVINGS CASES ONLY	6209	-425	3499	0	-19505	14550	1501	5826
COST SAVINGS CASES ONLY	1045	0	770	0	-5337	5800	46	2324
EMISSIONS SAVINGS CASE ONLY	8563	0	2584	0	0	6374	696	0
FUEL & COST SAVINGS CASES	1045	0	770	0	-5337	5800	46	2324
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	8563	0	2584	0	0	6317	2197	1444
FUEL SAVINGS CASES ONLY	0	0	0	0	0	-57	1501	1444
COST SAVINGS CASES ONLY	0	0	0	0	0	769	46	815
EMISSIONS SAVINGS CASE ONLY	8563	0	2584	0	0	6374	696	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	769	46	815
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

INDUSTRY	GAS GENERAL SUMMARY - PROCESS LEVEL				SAVINGS		STRATEGY MATCH-T		EMISSIONS SAVINGS		01	
	NO. 18 ADVANCED TECHNOLOGY GAS TURBINE (CLOSED CYCLE COAL/FAB)	FUEL ENERGY TOTAL	UTILITY	COST	DOLLARS	RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR	SIZE (MW)	ECS (MW)
NO. 01 MEAT PACKING	0.270	31.6	56.6	0.118	45390	0.400	1475049	0.400	-21382	60538	39156	5.23
NO. 02 DRYING	0.112	4.5	11.9	-0.203	-41114	0.291	643308	0.291	-6007	12784	6776	0.11*
NO. 03 PAINT BEVERAGE	0.100	22.0	70.3	-0.005	-11187	0.332	1223002	0.332	-39460	75209	36729	4.10*
NO. 04 NOVEN FAERIC MILL	0.053	5.7	17.9	-0.079	-31159	0.086	994348	0.086	-10316	19139	8822	0.43*
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	0	0.000	14469	98163	112632	0.00
NO. 06 NEWSPRINT MILL	0.130	16.6	36.3	0.183	79696	0.193	386122	0.193	-15796	35267	22471	27.11
NO. 07 WRITING PAPER MILL	0.237	29.0	70.2	0.311	152452	0.375	994188	0.375	-39877	88292	49416	21.19
NO. 08 CORRUGATED PAPER	0.257	168.4	353.7	0.350	658011	0.383	3310859	0.383	-151518	378246	224727	77.51
NO. 09 FOLIO BOARD	0.269	47.4	94.1	0.356	205892	0.390	937185	0.390	-38350	99822	61472	49.00
NO. 10 CHLORINE	0.146	97.4	175.9	0.182	450539	0.185	2078847	0.185	-68136	190596	122461	15.66
NO. 11 ALUMINA	0.028	4.7	89.1	-0.007	-2967	0.201	856121	0.201	-64663	94277	29614	43.35
NO. 12 LOW DENS. POLYETHYL	0.039	6.8	41.2	0.054	34349	0.096	625027	0.096	-27111	44127	17016	5.05
NO. 13 HI DENS. POLYETHYL	0.049	3.8	41.1	0.108	30439	0.203	549501	0.203	-29116	44017	14902	7.13
NO. 14 POLYVINYL CHLORIDE	0.074	8.5	42.4	0.103	43571	0.167	737943	0.167	-27416	45336	17970	3.84*
NO. 15 ST. LINE-OUT. RUB.	0.155	4.6	14.7	0.050	3641	0.290	228323	0.290	-8279	15781	7502	5.54
NO. 16 NYLON	0.066	1.9	13.0	0.055	5845	0.188	246530	0.188	-8685	13946	5262	2.56*
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	0	0.000	104155	7532	111687	0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	0	0.000	780461	16620	797088	0.00
NO. 19 PETROLEUM REFINING	0.073	163.7	462.7	0.353	5207847	0.057	8559009	0.057	-314922	495317	180395	29.98
NO. 20 TILES	0.095	10.4	55.5	0.120	48635	0.238	1095550	0.238	-36202	59403	23201	6.36
NO. 23 INTEGRATED STEEL	0.000	0.0	437.4	0.000	0	0.000	0	0.000	4342768	521814	4864582	0.00
NO. 24 GRAY IRON FOUNDRY	-0.064	-0.6	2.9	0.175	97646	-0.011	193772	-0.011	-4591	3152	-1439	0.63*
NO. 25 COPPER	0.089	14.2	68.6	0.131	77097	0.200	1331463	0.200	-44895	73451	28557	4.37*
NO. 26 MOTOR VEHICLE	0.037	18.2	55.6	0.063	47792	0.171	1391096	0.171	-32166	59490	27323	5.72
TOTAL - ALL		659	2375		7112860		27806976		4254943	2553370	680319	
FUEL SAVINGS CASES ONLY		659	1770		7015315		27613216		-932316	1906084	923772	
COST SAVINGS CASES ONLY		622	1585		7183383		24040192		-857441	1707630	840391	
EMISSIONS SAVINGS CASE ONLY		0	662		0		0		5241852	644137	5895989	
FUEL & COST SAVINGS CASES		602	1502		7091743		23986432		-862850	1704678	841830	
FUEL, COST & EMISSION SAVING		0	0		0		0		0	0	0	

COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR: 1990

NO. 13 ADVANCED TECHNOLOGY GAS TURBINE (CLOSED CYCLE COAL/FAB)

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10+12 BTU	10+12 BTU	10+12 BTU	10+12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TONS PER YEAR
TOTAL -- ALL	2471	8263			19009152		94416640		10550309	9023346
FUEL SAVINGS CASES ONLY	2473	7309			16321934		94045243		-3876377	7679756
COST SAVINGS CASES ONLY	2361	5910			19100704		60062928		-3110151	6503634
EMISSIONS SAVINGS CASE ONLY	0	1254			0		0		14673494	1337551
FUEL & COST SAVINGS CASES	2362	5904			18993536		79691520		-3101351	6497592
FUEL, COST & EMISSION SAVINGS	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

FUEL SAVINGS		10+12 BTU		TOTAL	
NATURAL GAS	PETROLEUM	COAL	BOILER FUEL	OTHER FUEL	
14769	425	0	0	0	
14769	425	0	0	0	
14769	425	0	0	0	
0	0	0	0	0	
14769	425	0	0	0	
0	0	0	0	0	

SITE PLUS UTILITY

FUEL SAVINGS ONLY									
TOTAL -- ALL	14769	-425	6032	0	0	0	-1935	2197	2471
FUEL SAVINGS CASES ONLY	14769	-425	3455	0	0	0	-8150	1423	2473
COST SAVINGS CASES ONLY	5710	-17	3051	0	0	0	-7358	1475	2361
EMISSIONS SAVING CASE ONLY	5639	0	2524	0	0	0	6374	696	0
FUEL & COST SAVINGS CASES	5639	-17	3047	0	0	0	-7704	1397	2362
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION									
TOTAL -- ALL	14769	-425	6032	0	0	0	-1935	2197	2471
FUEL SAVINGS CASES ONLY	14769	-425	3455	0	0	0	-8156	1423	2473
COST SAVINGS CASES ONLY	5710	-17	3051	0	0	0	-7353	1475	2361
EMISSIONS SAVING CASE ONLY	5639	0	2524	0	0	0	6374	696	0
FUEL & COST SAVINGS CASES	5639	-17	3047	0	0	0	-7704	1397	2362
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

FUEL SAVINGS CASES ONLY									
EMISSIONS SAVINGS CASE ONLY									
FUEL & COST SAVINGS CASES									
FUEL, COST & EMISSION SAVINGS									
TOTAL -- ALL	14769	-425	0	0	0	0	-1935	2197	2471
FUEL SAVINGS CASES ONLY	14769	-425	0	0	0	0	-1935	2197	2471
COST SAVINGS CASES ONLY	5710	-17	0	0	0	0	-7853	1423	2473
EMISSIONS SAVINGS CASE ONLY	3533	0	0	0	0	0	637+	1425	2361
FUEL & COST SAVINGS CASES	5639	-17	0	0	0	0	-7704	1397	2362
FUEL, COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO.19 ADVANCED TECHNOLOGY,STEAM INJECT.G/T,DIR.FIRED,PETROLEUM B.G.												
INDUSTRY	FUEL ENERGY TOTAL	SAVINGS FUEL	UTILITY	COST DOLLARS \$000	*** STRATEGY MATCH-T		EMISSIONS SAVINGS TONS PER YEAR	ECS SIZE (MM)	01			
					CAPITAL COST \$000	SAVINGS RATIO						
NO.01 MEAT PACKING	0.305	62.3	147.3	-0.062	-24008	0.526	-57016	157529	100512	13.05		
NO.02 BAKING	0.216	10.8	25.7	-0.123	-17510	0.526	-9946	27464	17519	0.22*		
NO.03 MALT BEVERAGE	0.307	58.6	138.6	-0.138	-36316	0.527	-53488	148236	94748	7.67*		
NO.04 WOVEN FABRIC MILL	0.300	32.3	77.8	0.146	57953	0.526	-30421	83274	52853	1.76*		
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	12986	98163	111149	0.00		
NO.06 NEWSPRINT MILL	0.283	34.0	83.1	0.198	86324	0.484	-32241	67545	55304	59.60		
NO.07 WRITING PAPER MILL	0.310	61.9	147.6	0.076	37204	0.527	-67138	185592	118454	42.70		
NO.08 CORRUGATED PAPER	0.310	355.2	846.2	0.000	702	0.527	-326341	900250	573909	118.84		
NO.09 EOX BOARD	0.309	97.6	233.7	0.037	21559	0.526	-90116	247823	157707	117.30		
NO.10 CHLORINE	0.297	244.0	652.2	0.149	368539	0.530	-275284	706702	431418	55.59		
NO.11 ALUMINA	0.228	48.6	133.8	-0.068	-29970	0.445	-56994	143242	86248	62.32		
NO.12 LOW DENS. POLYETHYL	0.231	40.2	126.8	0.131	83780	0.447	-57330	135649	78319	14.71		
NO.13 HI DENS. POLYETHYL	0.311	26.8	63.5	0.165	51874	0.527	-24646	68013	43368	10.37		
NO.14 POLYVINYL CHLORIDE	0.312	48.9	115.5	0.141	59438	0.527	-44636	123504	78868	9.86*		
NO.15 STYRENE-BUT. RUB.	0.290	13.2	30.8	-0.103	-7482	0.499	-11947	33046	21100	11.04		
NO.16 NYLON	0.311	9.7	23.0	0.177	18831	0.528	-8896	24680	15764	4.27*		
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	93480	7532	101012	0.00		
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	700469	16628	717096	0.00		
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0.000	2396786	313959	2710745	0.00		
NO.20 TIRES	0.312	63.1	143.8	0.043	17261	0.528	-57318	159275	101957	16.08		
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0.000	4342768	521814	4864582	0.00		
NO.24 GRAY IRON FOUNDRY	0.184	28.5	64.3	0.111	61660	0.335	-25305	68738	43434	12.69		
NO.25 COPPER	0.312	91.3	215.0	0.054	31892	0.527	-83319	230125	146806	12.87		
NO.26 MOTOR VEHICLE	0.286	100.4	236.5	0.002	1640	0.527	-91437	253296	161859	22.98		
TOTAL -- ALL					783371	9496647	6142670	4742076	10894744			
FUEL SAVINGS CASES ONLY					783371	9496647	-1403815	3783982	2380161			
COST SAVINGS CASES ONLY					1234	898657	-1214428	3274464	2060035			
EMISSIONS SAVINGS CASE ONLY					0	0	7546488	958096	8504584			
FUEL & COST SAVINGS CASES					1234	898657	-1214428	3274464	2060035			
FUEL,COST & EMISSION SAVING					0	0	-1214428	3274464	0	0		

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL													
NO.20 ADVANCED TECHNOLOGY,STEAM INJECT.G/T,DIR.FIRED,COAL DER. B.G.													
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		COST SAVING		CAPITAL EMISSIONS		EMISSIONS SAVINGS ----- TONS PER YEAR PLANT UTILITY TOTAL	ECS SIZE (MW)			
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	DOLLARS \$000	COST \$000	SAVINGS RATIO							
INDUSTRY	NO.01	MEAT PACKING	0.305	62.3	147.3	-0.062	-24008	728294	0.489	-62173	157529	95356	13.05
	NO.02	BAKING	0.216	10.8	25.7	-0.123	-17510	238991	0.489	-10845	27464	16619	0.22*
	NO.03	MALT BEVERAGE	0.307	50.6	138.6	-0.133	-36316	429643	0.490	-58322	148236	89914	7.67*
	NO.04	WOVEN FAERIC MILL	0.300	32.3	77.8	0.146	57953	417893	0.489	-33182	83274	50092	1.76*
	NO.05	SAN MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00
	NO.06	NEWSPRINT HILL	0.283	34.0	83.1	0.198	86324	192789	0.451	-35173	87545	52372	59.60
	NO.07	WRITING PAPER MILL	0.310	61.9	147.6	0.076	37204	429480	0.490	-73216	185592	112376	42.70
	NO.08	CORRUGATED PAPER	0.310	355.2	846.2	0.000	702	1824102	0.490	-355898	900250	544352	118.84
	NO.09	BOX BOARD	0.309	97.6	233.7	0.037	21559	523180	0.490	-98285	247823	149538	117.30
	NO.10	CHLORINE	0.297	244.0	652.2	0.149	368539	1476019	0.491	-300986	706702	405716	55.59
	NO.11	ALUMINA	0.228	48.6	133.8	-0.068	-29970	291880	0.412	-62279	143242	80964	62.32
	NO.12	LOW DENS. POLYETHYL	0.231	40.2	126.8	0.131	83780	329733	0.411	-62775	135649	72874	14.71
	NO.13	HI DENS. POLYETHYL	0.311	26.8	63.5	0.165	51874	171519	0.490	-26877	68013	41136	10.37
	NO.14	POLYVINYL CHLORIDE	0.312	48.9	115.5	0.141	59438	314959	0.490	-48675	123504	74829	9.86*
	NO.15	STYRENE-BUT. RUB.	0.290	13.2	30.8	-0.103	-7482	92229	0.464	-13028	33046	20018	11.04
	NO.16	NYLON	0.311	9.7	23.0	0.177	16831	82759	0.491	-9701	24680	14979	4.27*
	NO.17	STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00
	NO.18	ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00
	NO.19	PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00
	NO.20	TIRES	0.312	63.1	148.8	0.043	17261	456358	0.491	-62499	159275	96776	16.08
	NO.23	INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	521814	4864582	0.00
	NO.24	GRAY IRON FOUNDRY	0.182	31.7	93.4	0.056	31346	246891	0.343	-46320	99922	53602	18.43
	NO.25	COPPER	0.312	91.3	215.0	0.034	31892	569816	0.490	-90861	230125	139263	12.87
	NO.26	MOTOR VEHICLE	0.236	100.4	236.5	0.002	1640	745785	0.491	-99709	253296	153508	22.98
	TOTAL	-- ALL		1431	4435		753057	9562310		6361542	4773258	11134798	
	FUEL SAVINGS CASES ONLY			1431	3539		753057	9562310		-1550301	3915164	2264357	
	COST SAVINGS CASES ONLY			1237	3363		868343	7701274		-1344156	3305647	1961489	
	EMISSIONS SAVINGS CASE ONLY			0	895		0	0		7912346	950095	8970441	
	FUEL & COST SAVINGS CASES			1237	3953		868343	7731274		-1344156	3305647	1961438	
	FUEL,COST & EMISSION SAVING			0	0		0	0		0	0	0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.20 ADVANCED TECHNOLOGY STEAM INJECT. G/T, DIR. FIRED, COAL DER. B.G.

*** STRATEGY MATCH-T

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CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT UTILITY	TONS PER YEAR	TOTAL
TOTAL -- ALL	5890	16394	3561094	37488816	13105163	17919456	31024608
FUEL SAVINGS CASES ONLY	5090	14578	3561094	37488816	-6497155	15980115	9492948
COST SAVINGS CASES ONLY	5069	12444	4057301	31337216	-5526584	13696047	8169449
EMISSIONS SAVINGS CASE ONLY	0	1817	0	0	19592320	1939349	21531664
FUEL & COST SAVINGS CASES	5069	12444	4057301	31337216	-5526584	13696047	8169449
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU -----					TOTAL FUEL	
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	GAS DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14768	-425	6082	0	0	-13636	22955
FUEL SAVINGS CASES ONLY	2423	-425	1704	0	0	-13636	15631
COST SAVINGS CASES ONLY	1635	0	1255	0	0	-11641	13466
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	0	7324
FUEL & COST SAVINGS CASES	1835	0	1255	0	0	-11641	13466
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14768	-425	6082	0	0	-13636	22955	2197	5890
FUEL SAVINGS CASES ONLY	2423	-425	1704	0	0	-13636	15631	192	5890
COST SAVINGS CASES ONLY	1635	0	1255	0	0	-11641	13466	153	5069
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	0	7324	2005	0
FUEL & COST SAVINGS CASES	1835	0	1255	0	0	-11641	13466	153	5069
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	12345	0	4378	0	0	0	8765	2197	1633
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	1441	192	1633
COST SAVINGS CASES ONLY	0	0	0	0	0	0	1251	153	1404
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	0	7324	2005	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	1251	153	1404
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CIAS GENERAL SUMMARY - PROCESS LEVEL													*** STRATEGY MATCH-T			EMISSIONS SAVINGS			01																																																																																																																																																																																																																																																																																																																																																																																									
NO.21 ADVANCED TECHNOLOGY,STEAM INJECT.G/T,DIPECT FIRED,COAL(PFB)													CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	SAVINGS RATIO	TOTAL	ECS SIZE (MM)																																																																																																																																																																																																																																																																																																																																																																																										
INDUSTRY	FUEL SAVINGS RATIO	ENERGY TOTAL	UTILITY COST	SAVINGS DOLLARS \$000	UTILITY COST \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO								SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000

YEAR : 1990
NO.21 ADVANCED TECHNOLOGY,STEAM INJECT.G/T,DIRECT FIRED,COAL(PFB)
NATIONAL SUMMARY

--- COGENERATION TECHNOLOGY ALTERNATIVES STUDY ---
NATIONAL SUMMARY

*** STRATEGY MATCH-T

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR PLANT UTILITY TOTAL
TOTAL -- ALL	2026	16955	-1394159	154704320	10205296 18529136 28734432
FUEL SAVINGS CASES ONLY	2026	15139	-1394159	154704320	-9387023 16569796 7202765
COST SAVINGS CASES ONLY	834	5010	2686998	50889104	-3149401 5780630 2631228
EMISSIONS SAVINGS CASE ONLY	0	1917	0	0	19592320 1939349 21531664
FUEL & COST SAVINGS CASES	834	5010	2686998	50889104	-3149401 5780630 2631228
FUEL,COST & EMISSION SAVING	0	0	0	0	0 0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS 10**12 BTU	PETROLEUM 10**12 BTU	COAL 10**12 BTU	DISILLATE 10**12 BTU	BOILER 10**12 BTU	FUEL 10**12 BTU	COAL FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14768	-425	6082	0	0	0	5455	2197	2026
FUEL SAVINGS CASES ONLY	2423	-425	1704	0	0	0	-1869	192	2026
COST SAVINGS CASES ONLY	637	0	593	0	0	0	-487	91	834
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	0	7324	2005	0
FUEL & COST SAVINGS CASES	637	0	593	0	0	0	-487	91	834
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION	14768	-425	6082	0	0	0	5455	2197	2026
TOTAL -- ALL	2423	-425	1704	0	0	0	-1869	192	2026
FUEL SAVINGS CASES ONLY	637	0	593	0	0	0	-487	91	834
COST SAVINGS CASES ONLY	12345	0	4378	0	0	0	7324	2005	0
EMISSIONS SAVINGS CASE ONLY	637	0	593	0	0	0	-487	91	834
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL																
INDUSTRY	NO. 22 ADVANCED TECHNOLOGY, STEAM INJECTED G/T, INDIRECT FIRED, COAL (AFB)										*** STRATEGY MATCH-T		EMISSIONS SAVINGS		ECS SIZE (MM)	
	FUEL ENERGY TOTAL										CAPITAL COST \$000	SAVINGS RATIO	PLANT UTILITY	SAVINGS TOTAL		
	SAVINGS RATIO	SAVINGS FUEL	TOTAL UTILITY	INDIRECT FIRED	COAL (AFB)	COST DOLLARS \$000	SAVINGS RATIO	SAVINGS FUEL	SAVINGS RATIO	SAVINGS TOTAL						
NO. 01 MEAT PACKING	0.121	17.2	85.4	-0.128	-49999	0	0.000	91.7	0.000	0	1940518	0.292	-53696	91320	37624	7.92*
NO. 02 BAKING	-0.010	-0.4	3.6	-0.080	-11457	0	0.000	3.6	-0.080	-11457	157267	0.030	-3183	3874	691	0.03*
NO. 03 MALT BEVERAGE	-0.005	-0.3	2.2	0.192	50670	0	0.000	2.2	0.192	50670	263225	-0.008	-2727	2309	-418	0.12*
NO. 04 KOVEN FABRIC MILL	-0.007	-0.7	2.9	0.052	20661	0	0.000	2.9	0.052	20661	220265	-0.001	-3218	3153	-65	0.07*
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	91.7	0.000	0	0	0.000	14469	98163	112632	0.00
NO. 06 NEWSPRINT MILL	-0.012	-1.5	17.5	0.080	35042	0	0.000	17.5	0.080	35042	241479	0.033	-14507	18395	3609	13.08
NO. 07 WRITING PAPER MILL	-0.015	-1.7	22.0	0.153	74813	0	0.000	22.0	0.153	74813	462085	0.049	-21927	27678	5751	6.63*
NO. 08 CORRUGATED PAPER	-0.029	-14.6	173.8	0.216	405917	0	0.000	173.8	0.216	405917	2085155	0.089	-146645	184871	38225	38.24
NO. 09 BOX BOARD	-0.020	-6.0	211.4	-0.114	-65353	0	0.000	211.4	-0.114	-65353	1919119	0.209	-165212	224154	58942	111.36
NO. 10 CHLORINE	0.048	32.0	18.9	0.114	282500	0	0.000	18.9	0.114	282500	651920	0.039	5177	20441	25619	1.65*
NO. 11 ALUMINA	-0.074	-8.3	2.3	0.077	34190	0	0.000	2.3	0.077	34190	124802	-0.071	-8721	2493	-6228	0.93*
NO. 12 LOW DENS. POLYETHYL	-0.009	-1.7	5.5	0.034	21773	0	0.000	5.5	0.034	21773	199599	0.000	-5930	5936	6	0.67*
NO. 13 HI DENS. POLYETHYL	-0.006	-0.5	2.0	0.064	23719	0	0.000	2.0	0.064	23719	120644	-0.002	-2351	2178	-173	0.34*
NO. 14 POLYVINYL CHLORIDE	-0.005	-0.6	2.8	0.105	44374	0	0.000	2.8	0.105	44374	207137	-0.003	-3376	3004	-372	0.24*
NO. 15 STYRENE-BUT. RUB.	0.005	0.1	0.4	0.170	12272	0	0.000	0.4	0.170	12272	50462	-0.011	-554	397	-157	0.13*
NO. 16 NYLON	-0.007	-0.2	0.8	0.078	8319	0	0.000	0.8	0.078	8319	50186	0.000	-854	845	-9	0.15*
NO. 17 STYRENE	-0.018	-3.5	14.1	0.224	152212	0	0.000	14.1	0.224	152212	364464	-0.006	-15831	15073	-758	6.30*
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	16.2	0.000	0	0	0.000	780461	16628	797088	0.00
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00
NO. 20 TILES	-0.002	-0.2	2.2	0.147	59703	0	0.000	2.2	0.147	59703	256211	-0.004	-2717	2351	-366	0.23*
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00
NO. 24 GRAY IRON FOUNDRY	0.033	5.1	33.2	0.195	108465	0	0.000	33.2	0.195	108465	496001	0.088	-23566	35490	11924	6.88*
NO. 25 COPPER	-0.002	-0.4	3.2	0.146	85861	0	0.000	3.2	0.146	85861	332482	-0.008	-4568	3391	-1177	0.19*
NO. 26 MOTOR VEHICLE	-0.002	-0.4	3.7	0.087	65810	0	0.000	3.7	0.087	65810	382701	-0.006	-4820	3915	-906	0.35*
TOTAL -- ALL		13	1496		1359493	10525715				1359493	10525715		7328963	1601928	8930792	
FUEL SAVINGS CASES ONLY		54	135		353238	3139930				353238	3139930		-72639	147647	75009	
COST SAVINGS CASES ONLY		3	307		1456300	6508913				1456300	6508913		-257135	331919	74784	
EMISSIONS SAVINGS CASE ONLY		32	907		282500	651920				282500	651920		7613368	971004	8784372	
FUEL & COST SAVINGS CASES		37	52		403237	1198362				403237	1198362		-18943	56328	37385	
FUEL, COST & EMISSION SAVING		32	19		282500	651920				282500	651920		5177	20441	25619	

YEAR : 1990
 NO. 22 ADVANCED TECHNOLOGY, STEAM INJECTED G/T, INDIRECT FIRED, COAL (AFB)
 NATIONAL SUMMARY
 - COGENERATION TECHNOLOGY ALTERNATIVES STUDY -

07

*** STRATEGY MATCH-T

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS 5000	CAPITAL COST 5000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	-133	4397	5741412	41757728	17020864	4734351	21755232
FUEL SAVINGS CASES ONLY	115	272	807467	6393137	-139152	290993	151841
COST SAVINGS CASES ONLY	-141	1561	6126310	29593360	-1419524	1723008	303483
EMISSIONS SAVINGS CASE ONLY	72	1934	635562	1466675	19236288	1958750	21195040
FUEL & COST SAVINGS CASES	82	108	903326	2663534	-36227	115950	79724
FUEL, COST & EMISSION SAVING	72	42	635562	1466675	11648	45988	57636

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL FUEL		
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL DERIVED	COAL FUEL	OTHER FUEL	SAVINGS
TOTAL -- ALL	14654	-425	6082	0	2749	2197	-133
FUEL SAVINGS CASES ONLY	286	-17	70	0	-317	94	115
COST SAVINGS CASES ONLY	2491	-425	1721	0	-4135	207	-141
EMISSIONS SAVINGS CASE ONLY	12047	0	4275	0	7167	1974	72
FUEL & COST SAVINGS CASES	225	-17	55	0	-271	90	82
FUEL, COST & EMISSION SAVING	104	0	47	0	-80	0	72

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	2749	2197	-133
FUEL SAVINGS CASES ONLY	286	-17	70	0	-317	94	115
COST SAVINGS CASES ONLY	2491	-425	1721	0	-4135	207	-141
EMISSIONS SAVINGS CASE ONLY	12047	0	4275	0	7167	1974	72
FUEL & COST SAVINGS CASES	225	-17	55	0	-271	90	82
FUEL, COST & EMISSION SAVING	104	0	47	0	-80	0	72

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	2749	2197	-133
FUEL SAVINGS CASES ONLY	286	-17	70	0	-317	94	115
COST SAVINGS CASES ONLY	2491	-425	1721	0	-4135	207	-141
EMISSIONS SAVINGS CASE ONLY	12047	0	4275	0	7167	1974	72
FUEL & COST SAVINGS CASES	225	-17	55	0	-271	90	82
FUEL, COST & EMISSION SAVING	104	0	47	0	-80	0	72

Power Systems Division

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CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-T				EMISSIONS SAVINGS		ECS	
NO.23 ADVANCED TECHNOLOGY, COIN. CYCLE, DIRECT FIRED, PETROLEUM B.G.										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT UTILITY		TOTAL	
INDUSTRY	FUEL ENERGY TOTAL SAVINGS RATIO	UTILITY FUEL SAVINGS RATIO	COST SAVINGS DOLLARS \$000	EMISSIONS RATIO	PLANT UTILITY	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO
NO.01 MEAT PACKING	0.345	84.9	189.3	-0.218	-84815	0.563	1470868	0.563	-69714	202446	132732	16.85					
NO.02 BAKING	0.287	40.1	115.3	-1.332	-197365	0.572	1579563	0.572	-49508	123391	73683	0.99*					
NO.03 MALT BEVERAGE	0.347	79.8	177.7	-0.242	-63683	0.563	836839	0.563	-65232	190103	124870	9.88*					
NO.04 WOVEN FABRIC MILL	0.342	44.0	99.0	0.025	9395	0.563	977814	0.563	-36603	105948	69344	2.25*					
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	0	0.000	12986	98163	111149	0.00					
NO.06 NEWSPRINT MILL	0.349	46.2	103.9	0.221	96190	0.563	320844	0.563	-37745	109416	71670	74.90					
NO.07 WRITING PAPER MILL	0.350	84.4	189.1	0.046	22517	0.563	744829	0.563	-81791	237823	156031	55.02					
NO.08 CORRUGATED PAPER	0.350	464.1	1083.6	-0.020	-36204	0.563	3042255	0.563	-396991	1152785	755795	114.76					
NO.09 BOX BOARD	0.349	133.2	299.4	0.017	9814	0.563	866958	0.563	-109658	317523	207865	100.75					
NO.10 CHLORINE	0.378	252.6	482.1	0.266	660652	0.563	1654927	0.563	-156779	522389	365610	41.18					
NO.11 ALUMINA	0.287	103.8	281.9	-0.284	-125662	0.522	774850	0.522	-117929	301809	183879	132.71					
NO.12 LOW DENS. POLYETHYL	0.339	60.3	152.0	0.184	117604	0.570	635473	0.570	-60743	162649	101906	17.75					
NO.13 HI DENS. POLYETHYL	0.351	36.4	81.2	0.142	39764	0.563	355614	0.563	-29922	86977	57054	13.34					
NO.14 POLYVINYL CHLORIDE	0.351	66.5	148.1	0.036	36539	0.563	653597	0.563	-54453	159398	103945	12.71					
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0.000	0	0.000	9258	4463	13722	0.00					
NO.16 NYLON	0.351	13.2	29.3	0.108	11476	0.564	179694	0.564	-10769	31477	20709	5.48*					
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	0	0.000	93480	7532	101012	0.00					
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	0	0.000	700469	16628	717096	0.00					
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0.000	0	0.000	2396786	313959	2710745	0.00					
NO.20 TIRES	0.351	85.8	190.6	-0.029	-11824	0.564	691551	0.564	-69828	203978	134150	20.70					
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0.000	0	0.000	4342768	521814	4964592	0.00					
NO.24 GRAY IRON FOUNDRY	0.308	70.8	149.6	0.090	50147	0.506	550954	0.506	-53531	159959	106428	29.68					
NO.25 COPPER	0.351	124.2	276.1	-0.011	-6471	0.563	1155484	0.563	-101752	295424	193673	16.62					
NO.26 MOTOR VEHICLE	0.327	136.3	302.6	-0.048	-36135	0.564	1357910	0.564	-111133	324003	212070	29.55					
TOTAL -- ALL		1947	5251		490439		18050016		5941665	5649050	11590714						
FUEL SAVINGS CASES ONLY		1947	4351		490439		18050016		-1614080	4886493	3072410						
COST SAVINGS CASES ONLY		808	1734		1954597		6940701		-631995	1892554	1260561						
EMISSIONS SAVINGS CASE ONLY		0	900		0		0		7555746	562559	8518306						
FUEL & COST SAVINGS CASES		808	1734		1054597		6940701		-631995	1892554	1260561						
FUEL, COST & EMISSIONS SAVING		0	0		0		0		0	0	0						

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.23 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, PETROLEUM B.G.

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	8273	20793	8273	20793	2173990	69574016	11207594	22723924	33931376	13487726
ALL	8273	20793	8273	20793	2173990	69574016	11207594	22723924	33931376	13487726
FUEL SAVINGS CASES ONLY	8273	10556	8273	10556	2173990	69574016	-7274981	20762704	13487726	6761470
COST SAVINGS CASES ONLY	4125	9122	4125	9122	4404732	34733456	-3503728	10265200	6761470	20443656
EMISSIONS SAVINGS CASE ONLY	0	1837	0	1837	0	0	18462576	1961120	20443656	0
FUEL & COST SAVINGS CASES	4125	9122	4125	9122	4404732	34733456	-3503728	10265200	6761470	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED FUEL		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	DISTILLATE	BOILER FUEL	COAL	OTHER

SITE PLUS UTILITY	TOTAL	14760	-408	-9494	0	0	27353	2197	8273
	ALL	2374	-408	-13376	0	0	20003	180	8273
	FUEL SAVINGS CASES ONLY	935	0	-6806	0	0	9318	128	4125
	COST SAVINGS CASES ONLY	12374	0	4332	0	0	7350	2017	0
	EMISSIONS SAVINGS CASE ONLY	985	0	-6806	0	0	9818	128	4125
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION	TOTAL	14760	-408	-9494	0	0	27353	2197	8273
	ALL	2374	-408	-13376	0	0	20003	180	8273
	FUEL SAVINGS CASES ONLY	935	0	-6806	0	0	9318	128	4125
	COST SAVINGS CASES ONLY	12374	0	4332	0	0	7350	2017	0
	EMISSIONS SAVINGS CASE ONLY	985	0	-6806	0	0	9818	128	4125
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

Power Systems Division

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CTAS GENERAL SUMMARY - PROCESS LEVEL										** STRATEGY MATCH-T				EMISSIONS SAVINGS		01	
NO. 24 ADVANCED TECHNOLOGY, COAL, CIRCLE, DIRECT FIRED, COAL DER. B.G.										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT UTILITY		ECS SIZE (MM)	
INDUSTRY										FUEL ENERGY TOTAL SAVINGS \$000		UTILITY FUEL SAVINGS RATIO		TOTAL		TOTAL	
NO. 01 MEAT PACKING	0.345	24.9	189.3	-0.218	-84915					1470868	0.527	-76131	282446	126315	16.85		
NO. 02 BAKING	0.287	40.1	115.3	-1.332	-197365					1579563	0.532	-54334	123391	69058	0.99*		
NO. 03 MALT BEVERAGE	0.347	79.8	177.7	-0.242	-63683					836839	0.527	-71232	190103	110871	9.88*		
NO. 04 HOVEN FAERIC MILL	0.342	44.0	99.0	0.025	9895					977814	0.527	-39977	105948	65970	2.25*		
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0					0	0.000	14469	98163	112632	0.00		
NO. 06 NEWSPRINT MILL	0.349	46.2	103.9	0.221	96190					320844	0.527	-41224	109416	68192	74.90		
NO. 07 WRITING PAPER MILL	0.350	84.4	189.1	0.046	22517					744829	0.528	-69323	237822	148499	55.02		
NO. 08 CORRUGATED PAPER	0.350	454.1	1083.6	-0.020	-38204					3042255	0.528	-433559	1152785	719227	114.76		
NO. 09 BOX BOARD	0.349	133.2	299.4	0.017	9814					866958	0.527	-119766	317523	197757	100.75		
NO. 10 CHLORINE	0.378	252.6	482.1	0.266	680652					1654927	0.532	-170721	522389	351668	41.18		
NO. 11 ALUMINA	0.287	103.8	281.9	-0.204	-125662					774850	0.486	-129261	301809	172548	132.71		
NO. 12 LOW DENS. POLYETHYL	0.339	60.3	152.0	0.184	117604					635473	0.532	-66528	162649	96122	17.75		
NO. 13 HI DENS. POLYETHYL	0.351	36.4	81.2	0.142	39764					355614	0.528	-32678	86977	54299	13.34		
NO. 14 POLYVINYL CHLORIDE	0.351	66.5	148.1	0.066	36538					653597	0.528	-59466	158398	98932	12.71		
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0					0	0.000	10056	4463	14519	0.00		
NO. 16 NYLON	0.351	13.2	29.3	0.108	11476					179694	0.528	-11759	31477	19718	5.48*		
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0					0	0.000	104155	7532	111687	0.00		
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0					0	0.000	780461	16628	797088	0.00		
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0					0	0.000	2670494	313958	2984452	0.00		
NO. 20 TILES	0.351	85.8	190.6	-0.029	-11824					891551	0.528	-76251	203978	127728	20.70		
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0					0	0.000	4342768	521814	4864582	0.00		
NO. 24 GRAY IRON FOUNDRY	0.306	73.8	160.8	0.069	38630					584941	0.471	-64504	171984	107480	31.91		
NO. 25 COPPER	0.351	124.2	276.1	-0.011	-6471					1155484	0.527	-111123	295424	184301	16.62		
NO. 26 MOTOR VEHICLE	0.327	136.3	302.6	-0.048	-36135					1357910	0.528	-121359	324003	202644	29.55		
TOTAL -- ALL		1950	5262		478921					18034000		6153209	5661073	11814282			
FUEL SAVINGS CASES ONLY		1950	4362		478921					16034000		-1769190	468517	2929322			
COST SAVINGS CASES ONLY		811	1745		1043080					6974689		-695945	1904579	1208637			
EMISSIONS SAVINGS CASES ONLY		0	900		0					0		7922402	982553	6804600			
FUEL & COST SAVINGS CASES		811	1745		1043080					6974689		-695945	1904579	1208637			
FUEL, COST & EMISSIONS SAVINGS		10	0		0					0		0	0	0			

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 24 ADVANCED TECHNOLOGY, COB. CYCLE, DIRECT FIRED, COAL DER. B.G.

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 DTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 DTU	10**12 BTU	10**12 DTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	8279	20015			2151912		69639152		11679576	22746864 34426400
FUEL SAVINGS CASES ONLY	3279	18973			2151912		69639152		-7661790	20785760 12823960
COST SAVINGS CASES ONLY	4130	9144			4362654		34798592		-3837864	10286249 6450377
EMISSIONS SAVINGS CASE ONLY	0	1837			0		0		19641360	1961110 21602480
FUEL & COST SAVINGS CASES	4130	9144			4362654		34798592		-3837864	10286249 6450377
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	COAL	COAL FUEL	OTHER FUEL
TOTAL -- ALL	14763	-403	6002	0	-15592	27375 2197 8279
FUEL SAVINGS CASES ONLY	2374	-403	1700	0	-15592	20024 180 8279
COST SAVINGS CASES ONLY	825	0	791	0	-7613	9839 128 4130
EMISSIONS SAVINGS CASE ONLY	12394	0	4382	0	0	7350 2017 0
FUEL & COST SAVINGS CASES	825	0	791	0	-7613	9839 128 4130
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0 0 0

SITE PLUS UTILITY

TOTAL -- ALL	12394	0	4382	0	0	10339 2197 3168
FUEL SAVINGS CASES ONLY	0	0	0	0	0	2998 180 3168
COST SAVINGS CASES ONLY	0	0	0	0	0	1501 128 1629
EMISSIONS SAVINGS CASE ONLY	12394	0	4382	0	0	7350 2017 0
FUEL & COST SAVINGS CASES	0	0	0	0	0	1501 128 1629
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0 0 0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	12394	0	4382	0	0	10339 2197 3168
FUEL SAVINGS CASES ONLY	0	0	0	0	0	2998 180 3168
COST SAVINGS CASES ONLY	0	0	0	0	0	1501 128 1629
EMISSIONS SAVINGS CASE ONLY	12394	0	4382	0	0	7350 2017 0
FUEL & COST SAVINGS CASES	0	0	0	0	0	1501 128 1629
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0 0 0

Power Systems Division

FCR-1333

INDUSTRY	CTAS GENERAL SUMMARY - PROCESS LEVEL				NO. 25 ADVANCED TECHNOLOGY-COMBINED CYCLE-DIRECT FIRED-COAL/FBI				*** STRATEGY MATCH-Y				EMISSIONS SAVINGS				01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL SAVINGS	UTILITY SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	PLANT	UTILITY	TOTAL	TOTAL	
NO. 01 PEAT PACKING	0.235	45.3	105.2	-0.321	-125042	3018323	0.443	-63614	145702	0.443	-63614	145702	0.443	0.000	12.21	0.000	12.21
NO. 02 BAKING	0.164	7.0	23.7	-0.476	-67961	971707	0.449	-11066	25359	0.449	-11066	25359	0.449	0.000	0.204	0.000	0.204
NO. 03 MALT BEVERAGE	0.218	41.9	140.2	-0.309	-81160	2072352	0.439	-68656	150003	0.439	-68656	150003	0.439	0.000	7.85*	0.000	7.85*
NO. 04 WOOD PAPER MILL	0.190	22.4	87.5	-0.126	-50094	2104277	0.426	-45506	93652	0.426	-45506	93652	0.426	0.000	2.01*	0.000	2.01*
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	93163	0.000	14469	93163	0.000	0.000	0.000	0.000	0.000
NO. 06 NEWSPRINT MILL	0.215	25.8	74.8	0.235	102372	705152	0.389	-33628	78798	0.389	-33628	78798	0.389	0.000	45.171	54.22	45.171
NO. 07 PULPING PAPER MILL	0.245	45.4	133.3	0.180	87979	1548819	0.453	-71851	167617	0.453	-71851	167617	0.453	0.000	95755	38.97	95755
NO. 08 CORRUGATED PAPER	0.244	259.5	764.7	0.160	299502	6722459	0.452	-350402	813508	0.452	-350402	813508	0.452	0.000	463106	108.55	463106
NO. 09 EOP BOARD	0.244	71.3	209.3	0.181	104168	1873252	0.453	-95379	221977	0.453	-95379	221977	0.453	0.000	126598	106.18	126598
NO. 10 CHLORINE	0.224	149.8	374.4	0.237	587318	3760423	0.373	-159381	405696	0.373	-159381	405696	0.373	0.000	246315	32.18	246315
NO. 11 ALUMINA	0.139	31.7	149.6	-0.071	-31608	1387563	0.363	-82791	160139	0.363	-82791	160139	0.363	0.000	77348	78.57	77348
NO. 12 LOW DENS. POLYETHYL	0.122	21.3	81.3	0.099	63073	1033241	0.254	-42018	87019	0.254	-42018	87019	0.254	0.000	45002	9.52*	45002
NO. 13 HI DENS. POLYETHYL	0.194	18.6	73.2	0.110	30772	883912	0.425	-38301	78440	0.425	-38301	78440	0.425	0.000	40139	12.12	40139
NO. 14 POLYVINYL CHLORIDE	0.155	34.0	132.9	0.048	20393	1617407	0.426	-69212	142140	0.426	-69212	142140	0.426	0.000	72928	11.49	72928
NO. 15 STYRENE-OUT. RUB.	0.207	9.5	31.2	-0.168	-12173	402601	0.416	-15348	33473	0.416	-15348	33473	0.416	0.000	18125	11.31	18125
NO. 16 NYLON	0.211	6.9	24.4	0.083	8805	375329	0.435	-12257	26181	0.435	-12257	26181	0.435	0.000	13924	4.59*	13924
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	0.000	104155	7532	0.000	0.000	0.000	0.000	0.000
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	0.000	780461	16628	0.000	0.000	797088	0.00	797088
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	313958	0.000	2670494	313958	0.000	0.000	2984452	0.00	2984452
NO. 20 TILES	0.195	43.9	171.9	-0.144	-59332	2344215	0.426	-89458	183991	0.426	-89458	183991	0.426	0.000	94533	18.81	94533
NO. 23 INTEGRATED STEEL	0.000	0.0	457.4	0.000	0	0	0.000	4342768	521814	0.000	4342768	521814	0.000	0.000	4864582	0.00	4864582
NO. 24 CRAY IRON FOUNDRY	0.122	18.9	40.7	0.239	133230	616084	0.197	-16754	43502	0.197	-16754	43502	0.197	0.000	26748	8.12*	26748
NO. 25 COPPER	0.195	62.5	246.4	-0.064	-37628	2949321	0.425	-129796	265804	0.425	-129796	265804	0.425	0.000	136008	15.06	136008
NO. 26 MOTOR VEHICLE	0.180	69.7	273.3	-0.151	-114121	3689952	0.426	-142641	292685	0.426	-142641	292685	0.426	0.000	150044	26.89	150044
TOTAL -- ALL		937	4687		859486	3805424		6374277	4373773		6374277	4373773			10748050		10748050
FUEL SAVINGS CASES ONLY		937	3171		859486	3805424		-1538054	3415680		-1538054	3415680			1677609		1677609
COST SAVINGS CASES ONLY		651	1909		1437612	19139056		-259192	2064876		-259192	2064876			1175664		1175664
EMISSIONS SAVINGS CASE ONLY		0	86		0	0		7912346	453095		7912346	453095			8870441		8870441
FUEL & COST SAVINGS CASES		451	1809		1437612	19139056		-899192	2064876		-899192	2064876			1175664		1175664
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0	0		0	0			0		0

Power Systems Division

FCR-1333

UTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 26 ADVANCED TECHNOLOGY, COMBINED CYCLE, INDIRECT FIRED, COAL (AFB)									
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	*** STRATEGY MATCH-T		EMISSIONS SAVINGS TONS PER YEAR	ECS SIZE (MM)
						CAPITAL COST \$000	SAVINGS RATIO		
NO. 01 MEAT PACKING	0.207	27.1	74.0	-0.106	-41350	2153892	0.355	-37761	79107
NO. 02 BAKING	0.096	3.8	15.1	-0.310	-44283	691615	0.314	-8873	16176
NO. 03 MALT BEVERAGE	0.127	18.0	89.8	-0.239	-62969	1660880	0.305	-56057	96058
NO. 04 WOVEN FABRIC MILL	0.092	9.9	49.6	-0.096	-37890	1510871	0.216	-30980	53089
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	1440	98163
NO. 06 NEWSPRINT MILL	0.113	13.5	44.7	0.158	69028	505092	0.197	-24199	47068
NO. 07 WRITING PAPER MILL	0.167	23.0	85.5	0.193	94346	1226041	0.330	-57684	107567
NO. 08 CORRUGATED PAPER	0.181	139.2	470.1	0.208	399879	4829370	0.338	-260041	500084
NO. 09 BOX BOARD	0.191	39.7	125.2	0.230	132271	1364735	0.344	-67191	132786
NO. 10 CHLORINE	0.129	86.4	238.7	0.161	399099	3002628	0.203	-124241	258658
NO. 11 ALUMINA	0.058	9.7	87.0	-0.004	-1880	951665	0.226	-60152	93160
NO. 12 LOW DENS. POLYETHYL	0.053	9.3	47.2	0.048	30599	783144	0.118	-29659	50510
NO. 13 HI DENS. POLYETHYL	0.095	7.3	43.9	0.102	28581	675923	0.251	-28640	47069
NO. 14 POLYVINYL CHLORIDE	0.130	15.1	75.2	0.125	52728	1193425	0.305	-47001	80387
NO. 15 STYRENE-EXT. RUB.	0.121	4.2	20.0	-0.132	-9541	330232	0.283	-12515	21440
NO. 16 NYLON	0.102	3.0	15.0	0.056	5999	290276	0.239	-9431	16133
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	313958
NO. 20 TIRES	0.131	19.7	96.6	0.014	5697	1598656	0.307	-60082	103408
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814
NO. 24 GRAY IRON FOUNDRY	0.073	11.3	25.5	0.206	114929	498733	0.104	-13139	27240
NO. 25 COPPER	0.137	29.6	139.5	0.055	32064	2080727	0.305	-87287	149291
NO. 26 MOTOR VEHICLE	0.118	31.6	153.0	-0.034	-25532	2648088	0.307	-95308	163959
TOTAL -- ALL		500	2791		1131754	27935952		6802096	3001180
FUEL SAVINGS CASES ONLY		500	1876		1131754	27935952		-1110349	2043058
COST SAVINGS CASES ONLY		396	1407		1355205	18048752		-609595	1520199
EMISSIONS SAVINGS CASES ONLY		0	876		0	0		7912346	958055
FUEL & COST SAVINGS CASES		396	1407		1355205	18048752		-608595	1520199
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

10.25 ADVANCED TECHNOLOGY, COMBINED CYCLE, INDIRECT FIRED, COAL (AFB)

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	TOTAL UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	2052	9368	5557268	108636928	14749365	10773580	25522928
FUEL SAVINGS CASES ONLY	2052	6052	5557268	108636928	-4842953	8834234	3991261
COST SAVINGS CASES ONLY	1758	6321	6329710	80556176	-3719745	6981807	3262047
EMISSIONS SAVINGS CASE ONLY	0	1817	0	0	19592320	1939349	21531664
FUEL & COST SAVINGS CASES	1758	6321	6329710	80556176	-3719745	6981807	3262047
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS			COAL DERIVED			TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	
TOTAL -- ALL	14768	-425	6082	0	0	0	2052
FUEL SAVINGS CASES ONLY	2423	-425	1704	0	0	0	2052
COST SAVINGS CASES ONLY	1758	0	1211	0	0	0	1758
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	0	0
FUEL & COST SAVINGS CASES	1758	0	1211	0	0	0	1758
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14768	-425	6082	0	0	0	2052
FUEL SAVINGS CASES ONLY	2423	-425	1704	0	0	0	2052
COST SAVINGS CASES ONLY	1758	0	1211	0	0	0	1758
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	0	0
FUEL & COST SAVINGS CASES	1758	0	1211	0	0	0	1758
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14768	-425	6082	0	0	0	2052
FUEL SAVINGS CASES ONLY	2423	-425	1704	0	0	0	2052
COST SAVINGS CASES ONLY	1758	0	1211	0	0	0	1758
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	0	0
FUEL & COST SAVINGS CASES	1758	0	1211	0	0	0	1758
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 27 ADVANCED TECHNOLOGY, FUEL CELL, LOH TEMP., PETROLEUM DISTILLATE									
INDUSTRY	FUEL ENERGY		TOTAL UTILITY		COST SAVINGS		*** STRATEGY MATCH-T		01
	SAVINGS	RATIO	SAVINGS	FUEL	SAVINGS	DOLLARS	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS TONS PER YEAR
									PLANT UTILITY TOTAL

NO. 01 MEAT PACKING	0.313	78.8	194.7	-0.694	-269936	1645691	0.994	32149	200265 240413 17.24
NO. 02 BAKING	0.201	17.2	61.1	-0.786	-112242	394166	0.994	5410	65379 70789 0.52
NO. 03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	31683	20256 51939 0.00
NO. 04 WOVEN FABRIC MILL	0.105	11.3	48.7	-0.093	-36899	330879	0.542	2451	52096 54547 1.11
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	12986	98163 111149 0.00
NO. 06 NEWSPRINT MILL	0.225	47.0	179.7	-0.450	-196217	764823	0.978	13379	189265 202644 86.20
NO. 07 WRITING PAPER MILL	0.222	98.6	392.2	-1.574	-770474	2002523	0.987	32154	493312 525466 75.95
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	189040	218524 407564 0.00
NO. 09 BOX BOARD	0.229	166.4	642.6	-1.873	-1077269	2709206	0.994	47324	681463 728787 92.48
NO. 10 CHLORINE	0.235	168.9	549.4	-0.099	-218365	2523928	0.927	56689	595314 652002 46.85
NO. 11 ALUMINA	0.081	13.6	90.2	-0.362	-160417	434126	0.654	-479	96614 96134 42.14
NO. 12 LOW DENS. POLYETHYL	0.091	15.9	67.0	-0.058	-37263	339946	0.430	3757	71669 75426 7.78
NO. 13 HI DENS. POLYETHYL	0.119	9.1	38.4	-0.081	-22660	206397	0.600	1982	41146 43128 6.30
NO. 14 POLYVINYL CHLORIDE	0.141	16.2	67.0	-0.091	-38447	363228	0.718	3638	71636 75274 5.74
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	9258	4463 13722 0.00
NO. 16 NYLON	0.165	4.8	20.7	-0.114	-12144	108154	0.849	1099	22168 23267 3.85
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	93480	7532 101012 0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	700469	16628 717096 0.00
NO. 19 PETROLEUM REFINING	0.079	409.0	1379.5	-0.160	-2361478	7379591	0.401	78521	1476619 1555140 85.00
NO. 20 TIRES	0.150	20.4	82.3	-0.221	-89351	519633	0.762	4892	88040 92933 8.92
NO. 23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0	0.000	4342768	521814 4864582 0.00
NO. 24 GRAY IRON FOUNDRY	0.033	5.1	13.4	-0.019	-10550	82041	0.114	425	14346 14770 2.67
NO. 25 COPPER	0.150	29.5	119.2	-0.205	-120476	640472	0.762	6571	127519 134089 7.16
NO. 26 MOTOR VEHICLE	0.132	32.4	130.0	-0.226	-171241	877134	0.762	7507	140043 147550 12.75
TOTAL -- ALL		1144	4903		-5705922	21320896		5677149	5322261 10999417
FUEL SAVINGS CASES ONLY		1144	4077		-5705922	21320896		297467	4434895 4732355
COST SAVINGS CASES ONLY		0	0		0	0		0	0 0
EMISSIONS SAVINGS CASE ONLY		1130	4913		-5545506	20886768		5677628	5225648 10903283
FUEL & COST SAVINGS CASES		0	0		0	0		0	0 0
FUEL & COST & EMISSIONS SAVING		0	0		0	0		0	0 0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 27 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP., PETROLEUM DISTILLATE

07

*** STRATEGY MATCH-T

CATEGORY	TOTAL		UTILITY		COST SAVINGS		CAPITAL		EMISSIONS SAVINGS	
	SAVINGS	FUEL	SAVINGS	FUEL	DOLLARS	\$000	COST	\$000	PLANT	TONS PER YEAR
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU					UTILITY	TOTAL
--- ALL	4749	20291			-27566272		90105552		16030691	22744048
FUEL SAVINGS CASES ONLY	4749	18140			-27566272		90105552		1308962	20452300
COST SAVINGS CASES ONLY	0	0			0		0		0	0
EMISSIONS SAVINGS CASE ONLY	4608	19356			-25904176		85687520		16035656	21743024
FUEL & COST SAVINGS CASES	0	0			0		0		0	0
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL PETROLEUM	PETROLEUM	GAS	DISTILLATE	BOILER	FUEL	COAL	OTHER
	SAVINGS	BOILER	SAVINGS	SAVINGS	SAVINGS	SAVINGS	FUEL	SAVINGS
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
---	14772	-16188	-2372	0	0	0	26851	2197
FUEL SAVINGS CASES ONLY	5516	-16188	-5385	0	0	0	19327	1479
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14349	-14970	-2374	0	0	0	25916	2197
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

---	14772	-16188	-2372	0	0	0	26851	2197	4749
FUEL SAVINGS CASES ONLY	5516	-16188	-5385	0	0	0	19327	1479	4749
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14349	-14970	-2374	0	0	0	25916	2197	4608
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

---	14772	-16188	-2372	0	0	0	26851	2197	4749
FUEL SAVINGS CASES ONLY	5516	-16188	-5385	0	0	0	19327	1479	4749
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14349	-14970	-2374	0	0	0	25916	2197	4608
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
INDUSTRY	NO. 28 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP. COAL DERIVED DIST			*** STRATEGY MATCH-T			EMISSIONS SAVINGS		
	FUEL ENERGY TOTAL	UTILITY	COST SAVINGS	CAPITAL COST \$000	SAVINGS RATIO	EMISSIONS PLANT	SAVINGS PER YEAR	EMISSIONS TOTAL	ECS SIZE (MM)
	SAVINGS RATIO	SAVINGS	FUEL SAVINGS RATIO	DOLLARS \$000			UTILITY		
NO. 01 MEAT PACKING	0.404	56.4	82.9	-0.073	-28434	975802	0.794	11580	88685
NO. 02 BAKING	0.245	9.8	15.0	-0.036	-5181	129456	0.778	1847	16029
NO. 03 MALT BEVERAGE	0.379	53.4	88.9	-0.219	-57825	573205	0.788	7677	95065
NO. 04 MOVEN FABRIC MILL	0.138	16.0	85.7	-0.277	-109823	713110	0.637	-20992	91607
NO. 05 SAN MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163
NO. 06 NEWSPRINT MILL	0.259	31.1	61.5	0.032	13860	367518	0.567	1161	64746
NO. 07 WRITING PAPER MILL	0.402	56.2	87.2	0.057	20066	647861	0.793	11905	109668
NO. 08 CORRUGATED PAPER	0.412	321.6	480.5	0.003	5569	2862392	0.796	63137	511169
NO. 09 BOX BOARD	0.411	68.3	132.6	0.041	23470	806712	0.795	17108	140565
NO. 10 CHLORINE	0.193	199.0	861.1	-0.497	-1234231	4973218	0.742	-151705	933030
NO. 11 ALUMINA	0.096	24.4	174.4	-0.868	-393200	1020174	0.575	-48824	186689
NO. 12 LOW DENS. POLYETHYL	0.137	23.8	128.6	-0.191	-121818	803471	0.599	-31488	137668
NO. 13 HI DENS. POLYETHYL	0.142	13.3	70.9	-0.332	-93353	460832	0.637	-17474	76004
NO. 14 POLYVINYL CHLORIDE	0.142	24.3	130.0	-0.490	-207021	844215	0.637	-31963	138974
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	4463
NO. 16 HALCH	0.152	6.6	36.8	-0.556	-59246	242129	0.673	-8990	39471
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628
NO. 19 PETROLEUM REFINING	0.089	575.3	2679.3	-0.412	-6071728	17570368	0.399	-657052	2867927
NO. 20 TIRES	0.142	31.3	167.8	-0.841	-340799	1268631	0.637	-41114	179572
NO. 23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	521814
NO. 24 GRAY IRON FOUNDRY	0.043	6.6	25.2	-0.049	-27528	179202	0.151	-6569	26993
NO. 25 COPPER	0.142	45.3	242.2	-0.793	-460043	1556766	0.636	-59919	259228
NO. 26 MOTOR VEHICLE	0.131	49.8	266.3	-0.762	-577683	2140832	0.637	-65595	285195
TOTAL - ALL	1633	6423			-9722924	33140648		4224638	6896957
FUEL SAVINGS CASES ONLY	1633	5317			-9722924	33140648		-1027269	6243359
COST SAVINGS CASES ONLY	497	762			70905	4684473		93311	826149
EMISSIONS SAVINGS CASE ONLY	617	1555			-20455	6362935		5366322	1674526
FUEL & COST SAVINGS CASES	497	762			70905	4684473		93311	826149
FUEL, COST & EMISSIONS SAVING	497	762			70905	4684473		93311	826149

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.28 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP. COAL DERIVED DIST

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	5629	18557			-23262464	111751360			12159200	20092576
FUEL SAVINGS CASES ONLY	5629	17383			-23262464	111751360			-2363329	18733248
COST SAVINGS CASES ONLY	2972	4715			741960	30083168			522109	5255271
EMISSIONS SAVINGS CASE ONLY	3201	6347			566686	33300448			15035100	6997529
FUEL & COST SAVINGS CASES	2972	4715			741960	30083168			522109	5255271
FUEL, COST & EMISSION SAVING	2972	4715			741960	30083168			522109	5255271

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	BOILER FUEL	BOILER FUEL	BOILER FUEL	BOILER FUEL	BOILER FUEL
TOTAL -- ALL	14768	-408	6082	-8143	25118	2197	5629	5629
FUEL SAVINGS CASES ONLY	6156	-403	3495	-8143	18717	1469	5529	5529
COST SAVINGS CASES ONLY	1140	0	1028	0	5313	0	2972	2972
EMISSIONS SAVINGS CASE ONLY	9868	0	3665	0	12096	734	3201	3201
FUEL & COST SAVINGS CASES	1140	0	1028	0	5313	0	2972	2972
FUEL, COST & EMISSION SAVING	1140	0	1028	0	5313	0	2972	2972

SITE PLUS UTILITY

TOTAL -- ALL	8612	0	2588	0	4293	2197	-618	-618
FUEL SAVINGS CASES ONLY	0	0	0	0	-2107	1489	-618	-618
COST SAVINGS CASES ONLY	0	0	0	0	1968	0	1968	1968
EMISSIONS SAVINGS CASE ONLY	8612	0	2588	0	8495	734	2120	2120
FUEL & COST SAVINGS CASES	0	0	0	0	1968	0	1968	1968
FUEL, COST & EMISSION SAVING	0	0	0	0	1968	0	1968	1968

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	8612	0	2588	0	4293	2197	-618	-618
FUEL SAVINGS CASES ONLY	0	0	0	0	-2107	1489	-618	-618
COST SAVINGS CASES ONLY	0	0	0	0	1968	0	1968	1968
EMISSIONS SAVINGS CASE ONLY	8612	0	2588	0	8495	734	2120	2120
FUEL & COST SAVINGS CASES	0	0	0	0	1968	0	1968	1968
FUEL, COST & EMISSION SAVING	0	0	0	0	1968	0	1968	1968

Power Systems Division

FCR-1333

CIAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-T				EMISSIONS SAVINGS				01	
NO.29 ADVANCED TECHNOLOGY FUEL CELL/HIGH TEMP./PETROLEUM DIST.										CAPITAL COST \$000		SAVINGS DOLLARS \$000		RATIO		SAVINGS RATIO		TOTAL	
INDUSTRY	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000
NO.01 MEAT PACKING	0.398	65.6	107.9	107.9	-0.153	-59516	1074936	0.810	5169	115429	120599	9.53	5169	115429	120599	9.53	5169	115429	120599
NO.02 BAKING	0.310	49.4	135.1	135.1	-1.511	-215747	956339	0.813	-22310	144535	122226	1.15	-22310	144535	122226	1.15	-22310	144535	122226
NO.03 MALT BEVERAGE	0.000	0.0	18.9	18.9	0.000	0	0	0.000	31683	20256	51939	0.00	31683	20256	51939	0.00	31683	20256	51939
NO.04 MOVEN FABRIC MILL	0.332	177.4	504.6	504.6	-1.796	-712147	3120119	0.811	-87845	540005	452160	11.49	-87845	540005	452160	11.49	-87845	540005	452160
NO.05 SAW MILL	0.000	0.0	91.7	91.7	0.000	0	0	0.000	12986	98163	111149	0.00	12986	98163	111149	0.00	12986	98163	111149
NO.06 NEWSPRINT MILL	0.347	141.2	377.8	377.8	-0.898	-391507	1777472	0.814	-59533	397859	338326	90.71	-59533	397859	338326	90.71	-59533	397859	338326
NO.07 WRITING PAPER MILL	0.271	79.7	242.4	242.4	-0.795	-389003	1425403	0.702	-35838	304881	269043	70.25	-35838	304881	269043	70.25	-35838	304881	269043
NO.08 CORRUGATED PAPER	0.277	450.5	1326.0	1326.0	-1.017	-1909302	6396359	0.783	-157610	1410668	1253058	93.22	-157610	1410668	1253058	93.22	-157610	1410668	1253058
NO.09 BOX BOARD	0.290	122.9	356.8	356.8	-0.836	-481001	1742677	0.784	-41199	378325	337126	89.63	-41199	378325	337126	89.63	-41199	378325	337126
NO.10 CHLORINE	0.352	770.9	2018.6	2018.6	-0.842	-2089897	9767038	0.815	-317532	2187188	1869656	26.15	-317532	2187188	1869656	26.15	-317532	2187188	1869656
NO.11 ALUMINA	0.198	71.8	283.9	283.9	-1.175	-520211	1351390	0.717	-49874	303953	254079	88.48	-49874	303953	254079	88.48	-49874	303953	254079
NO.12 LOW DENS. POLYETHYL	0.338	151.0	420.4	420.4	-0.635	-405708	2072752	0.812	-71289	449962	378672	48.86	-71289	449962	378672	48.86	-71289	449962	378672
NO.13 HI DENS. POLYETHYL	0.334	147.6	419.8	419.8	-1.966	-552268	2036309	0.811	-73249	449784	376535	68.93	-73249	449784	376535	68.93	-73249	449784	376535
NO.14 POLYVINYL CHLORIDE	0.237	69.8	253.4	253.4	-0.918	-387967	1302152	0.775	-40592	270957	230365	21.68	-40592	270957	230365	21.68	-40592	270957	230365
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	4.2	0.000	0	0	0.000	9258	4463	13722	0.00	9258	4463	13722	0.00	9258	4463	13722
NO.16 NYLON	0.337	47.4	132.6	132.6	-1.588	-169264	676406	0.811	-22826	142230	119803	24.76	-22826	142230	119803	24.76	-22826	142230	119803
NO.17 STYRENE	0.000	0.0	7.0	7.0	0.000	0	0	0.000	93430	7532	101012	0.00	93430	7532	101012	0.00	93430	7532	101012
NO.18 ETHYLENE	0.000	0.0	16.2	16.2	0.000	0	0	0.000	700469	16628	717096	0.00	700469	16628	717096	0.00	700469	16628	717096
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	293.3	0.000	0	0	0.000	2396786	313959	2710745	0.00	2396786	313959	2710745	0.00	2396786	313959	2710745
NO.20 TIRES	0.237	90.0	326.5	326.5	-1.435	-581070	1941931	0.776	-52099	349383	297284	35.36	-52099	349383	297284	35.36	-52099	349383	297284
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	487.4	0.000	0	0	0.000	4342768	521814	4064582	0.00	4342768	521814	4064582	0.00	4342768	521814	4064582
NO.24 GRAY IRON FOUNDRY	0.052	9.6	21.0	21.0	-0.008	-4247	133634	0.143	-3891	22494	18604	4.17	-3891	22494	18604	4.17	-3891	22494	18604
NO.25 COPPER	0.237	130.2	472.0	472.0	-1.360	-799787	2395540	0.775	-75818	505080	429262	28.32	-75818	505080	429262	28.32	-75818	505080	429262
NO.26 MOTOR VEHICLE	0.226	143.2	519.5	519.5	-1.285	-973628	3330501	0.776	-83291	556291	473000	50.58	-83291	556291	473000	50.58	-83291	556291	473000
TOTAL -- ALL		2718	8037	8037		-10642264	41408096		-10642264	41408096	15909837		-10642264	41408096	15909837		-10642264	41408096	15909837
FUEL SAVINGS CASES ONLY		2718	7918	7918		-10642264	41408096		-10642264	41408096	15909837		-10642264	41408096	15909837		-10642264	41408096	15909837
COST SAVINGS CASES ONLY		0	0	0		0	0		0	0	0		0	0	0		0	0	0
EMISSIONS SAVINGS CASE ONLY		60	1027	1027		-59516	1074936		-59516	1074936	8690844		-59516	1074936	8690844		-59516	1074936	8690844
FUEL & COST SAVINGS CASES		0	0	0		0	0		0	0	0		0	0	0		0	0	0
FUEL, COST & EMISSIONS SAVINGS		0	0	0		0	0		0	0	0		0	0	0		0	0	0

YEAR : 1990
 NO.29 ADVANCED TECHNOLOGY,FUEL CELL,HIGH TEMP.,PETROLEUM DIST.
 NATIONAL SUMMARY
 *** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
TOTAL -- ALL	11398	35418			-45315632	171367072	13459493	38494416	51953952			
FUEL SAVINGS CASES ONLY	11368	33545			-45315632	171367072	-5083812	36494560	31410816			
COST SAVINGS CASES ONLY	0	0			0	0	0	0	0			
EMISSIONS SAVINGS CASE ONLY	126	2030			-114081	2060448	18553216	2221203	20774416			
FUEL & COST SAVINGS CASES	0	0			0	0	0	0	0			
FUEL,COST & EMISSION SAVING	0	0			0	0	0	0	0			

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
NATURAL PETROLEUM	14772	-27213	0	0	41979	11388
GAS	2319	-27213	0	0	34590	11388
DISTILLATE	0	0	0	0	0	0
BOILER FUEL	12514	-163	0	0	7618	126
FUEL	0	0	0	0	0	0
COAL	0	0	0	0	0	0
FUEL	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14772	-27213	5934	0	0	41979	2197	11388
FUEL SAVINGS CASES ONLY	2319	-27213	1522	0	0	34590	170	11388
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	12514	-163	4426	0	0	7618	2031	126
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14772	-27213	5934	0	0	41979	2197	11388
FUEL SAVINGS CASES ONLY	2319	-27213	1522	0	0	34590	170	11388
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	12514	-163	4426	0	0	7618	2031	126
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

INDUSTRY	GAS GENERAL SUMMARY - PROCESS LEVEL				NO. 30 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP, COAL DER. DIST.				*** STRATEGY MATCH-T				EMISSIONS SAVINGS				01 ECS SIZE (MM)
	FUEL SAVINGS RATIO	FUEL SAVINGS	UTILITY SAVINGS	COST RATIO	FUEL SAVINGS RATIO	UTILITY SAVINGS	COST RATIO	DOLLARS 5000	CAPITAL COST 5000	SAVINGS RATIO	EMISSIONS SAVINGS	PLANT TOTAL	TONS PER YEAR UTILITY	SAVINGS TOTAL	EMISSIONS SAVINGS	PLANT TOTAL	
NO. 01 MEAT PACKING	0.419	64.4	64.4	0.023	-0.023	-3805		-3805	840168	0.790	7811	103276	111087	8.52			
NO. 02 BAKING	0.256	11.6	21.0	-0.077	-11061			-11061	136677	0.778	61	22504	22565	0.18*			
NO. 03 MALT BEVERAGE	0.309	62.5	108.5	-0.213	-56118			-56118	519630	0.781	2101	116043	116144	5.99			
NO. 04 WOVEN FABRIC MILL	0.323	34.8	64.7	0.072	28510			28510	395739	0.670	-482	69192	68711	1.46			
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0			0	0	0.000	14469	98163	112632	0.00			
NO. 06 NEWSPRINT MILL	0.318	227.4	686.0	-1.963	-855869			-855869	2784374	0.774	-147640	722330	574690	98.91			
NO. 07 WRITING PAPER MILL	0.410	64.9	105.9	0.063	30920			30920	586463	0.786	5652	133230	138883	30.50			
NO. 08 CORRUGATED PAPER	0.420	369.3	578.1	0.017	31203			31203	2564735	0.789	35712	615020	650732	80.74			
NO. 09 BOX BOARD	0.425	101.0	155.6	0.069	39902			39902	709789	0.789	10763	164967	175730	77.62			
NO. 10 CHLORINE	0.329	220.1	318.4	0.153	378932			378932	1440957	0.562	26616	344946	371563	26.93			
NO. 11 ALUMINA	0.265	52.3	184.7	-0.126	-55624			-55624	448741	0.653	-4148	112055	107907	48.52			
NO. 12 LOW DENS. POLYETHYL	0.295	79.0	241.5	-0.233	-140741			-140741	1080751	0.739	-53949	258438	204489	28.08			
NO. 13 HI DENS. POLYETHYL	0.375	28.6	50.7	0.121	34078			34078	236014	0.745	460	54325	54785	8.25			
NO. 14 POLYVINYL CHLORIDE	0.328	52.4	93.7	0.075	31724			31724	436662	0.779	513	100219	100732	7.97			
NO. 15 STYRENE-BUT. RUB.	0.362	14.1	24.1	-0.160	-13042			-13042	124259	0.731	410	25062	26271	8.60			
NO. 16 NYLON	0.361	10.4	18.8	0.111	11840			11840	91792	0.723	85	20171	20256	3.48			
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0			0	0	0.000	104155	7532	111687	0.00			
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0			0	0	0.000	780461	16628	797088	0.00			
NO. 19 PETROLEUM REFINING	0.187	1010.1	1613.3	-0.052	-764043			-764043	7705962	0.400	31642	1726853	1758495	98.59			
NO. 20 TIRES	0.390	67.6	119.7	-0.049	-19570			-19570	645869	0.780	1258	128090	129349	12.88			
NO. 23 INTEGRATED STEEL	0.000	0.0	437.4	0.000	0			0	0	0.000	4342768	521814	4664582	0.00			
NO. 24 GRAY IRON FOUNDRY	0.218	38.4	95.7	-0.064	-35539			-35539	443234	0.575	-11129	102353	91223	18.84			
NO. 25 COPPER	0.390	97.7	172.8	-0.027	-15618			-15618	790279	0.779	1344	164878	186221	10.30			
NO. 26 MOTOR VEHICLE	0.352	107.5	190.7	-0.005	-64041			-64041	1107848	0.780	1549	204213	205763	18.45			
TOTAL -- ALL		2714	5453		-1460901			-1460901	23087904		5150400	5853093	11003580				
FUEL SAVINGS CASES ONLY		2714	4260		-1460901			-1460901	23087904		-91370	5208959	5117591				
COST SAVING CASES ONLY		892	1366		557163			557163	6460149		79320	1502069	1581390				
EMISSIONS SAVINGS CASE ONLY		2382	4270		-393841			-393841	17445033		5367829	4508928	9926561				
FUEL & COST SAVINGS CASES		612	1368		597168			597168	6460143		79320	1502069	1581390				
FUEL, COST & EMISSIONS SAVING		847	1381		555053			555053	6074410		79802	1432877	1512680				

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 30 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP, COAL DER. DIST.

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	SAVINGS	10**12 BTU	DOLLARS \$000	\$000	\$000	\$000	PLANT	TONS PER YEAR
TOTAL -- ALL	11094	24729			-13956823		105394384		12374370	26569376
FUEL SAVINGS CASES ONLY	11094	23474			-13953823		105364384		-2099114	25231824
COST SAVINGS CASES ONLY	3532	6135			2018221		29705643		337981	6902936
EMISSIONS SAVINGS CASE ONLY	6639	11939			90737		52378263		14902681	13056398
FUEL & COST SAVINGS CASES	3382	6165			2018221		29705643		337991	6902036
FUEL, COST & EMISSION SAVING	3315	6061			1963573		23966256		333904	6770207

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	DISTILLATE	BOILER FUEL	COAL	OTHER	SAVINGS	SAVINGS
TOTAL -- ALL	14768	-425	6082	0	-18639	-5963	31289	2197
FUEL SAVINGS CASES ONLY	6206	-425	3499	0	-18639	-5963	24915	1501
COST SAVINGS CASES ONLY	1258	0	984	0	-5422	0	7025	37
EMISSIONS SAVINGS CASE ONLY	14013	-17	5466	0	-9401	-5694	18385	2102
FUEL & COST SAVINGS CASES	1253	0	984	0	-5422	0	7025	37
FUEL, COST & EMISSION SAVING	1240	0	967	0	-5313	0	6889	33

SITE PLUS UTILITY

TOTAL -- ALL	11094	24729			-13956823		105394384		12374370	26569376
FUEL SAVINGS CASES ONLY	11094	23474			-13953823		105364384		-2099114	25231824
COST SAVINGS CASES ONLY	3532	6135			2018221		29705643		337981	6902936
EMISSIONS SAVINGS CASE ONLY	6639	11939			90737		52378263		14902681	13056398
FUEL & COST SAVINGS CASES	3382	6165			2018221		29705643		337991	6902036
FUEL, COST & EMISSION SAVING	3315	6061			1963573		23966256		333904	6770207

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	8563	0	2594	0	0	0	9399	2197	4527
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	3025	1501	4527
COST SAVINGS CASES ONLY	0	0	0	0	0	0	2462	37	2519
EMISSIONS SAVINGS CASE ONLY	8563	0	2594	0	0	0	8701	2102	3733
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	2482	37	2519
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	2451	33	2484

CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO. 31 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP., COAL GASIFIER											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		SAVINGS		COST		DOLLARS		ECS SIZE (MW)
	SAVINGS	FUEL	SAVINGS	FUEL	RATIO	COST	SAVINGS	\$000	PLANT UTILITY		
*** STRATEGY MATCH-T											
CAPITAL COST \$000											
EMISSIONS RATIO											
EMISSIONS SAVINGS											
TOTAL											
NO. 01 MEAT PACKING	0.322	42.2	74.2	-0.106	-41131	2675577	0.901	25775	79347	105122	6.54*
NO. 02 BAKING	0.167	6.9	16.2	-0.183	-26111	615969	0.894	3970	17357	21327	0.14*
NO. 03 MILK BEVERAGE	0.240	35.5	95.8	-0.133	-34942	1946862	0.891	20353	102427	122780	5.28*
NO. 04 WOVEN FABRIC MILL	0.175	18.9	56.8	-0.043	-17034	1696425	0.694	10416	60743	71159	1.28*
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00
NO. 06 NEWSPRINT MILL	0.169	22.6	49.9	0.191	83470	713957	0.560	12450	52595	65045	35.59
NO. 07 WRITING PAPER MILL	0.267	39.8	93.2	0.226	110566	1668950	0.894	26561	117241	143902	26.81
NO. 08 CORRUGATED PAPER	0.260	227.2	511.9	0.287	538155	6179763	0.896	131822	544524	676347	107.14
NO. 09 BOX BOARD	0.235	62.7	137.2	0.280	160900	1824271	0.896	36577	145533	182111	68.42
NO. 10 CHLORINE	0.207	133.2	273.3	0.194	480262	4273583	0.567	78564	296094	374648	23.10
NO. 11 ALUMINA	0.149	26.0	95.3	0.031	13730	1315000	0.740	12906	102012	114918	44.14
NO. 12 LOW DENS. POLYETHYL	0.101	17.7	55.1	0.062	39705	1068501	0.387	9571	58985	68556	6.35*
NO. 13 HI DENS. POLYETHYL	0.202	15.4	48.9	0.139	38934	901981	0.826	8324	52391	60705	7.96*
NO. 14 POLYVINYL CHLORIDE	0.222	28.6	87.0	0.121	51077	1629399	0.889	15549	93052	108600	7.40*
NO. 15 STYRENE-BUT. RUB.	0.224	8.1	21.3	-0.114	-8267	440073	0.830	4458	22860	27316	7.60*
NO. 16 NYLON	0.193	5.7	16.9	0.092	7801	366394	0.763	3192	18174	21366	3.13*
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00
NO. 19 PETROLEUM REFINING	0.114	602.4	1469.8	0.027	396307	20202224	0.440	295733	1573230	1868963	89.82
NO. 20 TILES	0.229	37.3	109.5	0.001	564	2224268	0.890	20723	117205	137929	11.78*
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4964582	0.00
NO. 24 GRAY IRON FOUNDRY	0.015	2.3	6.6	-0.017	-9216	192773	0.049	-477	7105	6628	1.34*
NO. 25 COPPER	0.229	54.0	153.6	0.067	39807	2307590	0.890	29368	169732	199100	9.46*
NO. 26 MOTOR VEHICLE	0.205	59.3	174.7	-0.049	-37073	3674644	0.890	32563	187029	219592	16.90*

TOTAL - ALL		1450	4155		178290	56497243		6020246	4461745	10481995	
FUEL SAVINGS CASES ONLY		1450	4155		178290	56497243		778396	3317610	4586006	
COST SAVINGS CASES ONLY		1277	3107		1963073	45255776		661339	3300744	4022883	
EMISSIONS SAVINGS CASE ONLY		1447	4143		1785303	53104480		6020724	4454040	10475168	
FUEL & COST SAVINGS CASES		1277	3107		1963073	45255776		661339	3300744	4022883	
FUEL, COST & EMISSIONS SAVING		1277	3107		1963073	45255776		661339	3300744	4022883	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 31 ADVANCED TECHNOLOGY, FUEL CELL-HIGH TEMP., COAL GASIFIER

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	TOTAL
					PLANT UTILITY	
TOTAL -- ALL	4703	12934	8116611	182705264	17098992	31173664
FUEL SAVINGS CASES ONLY	4703	11050	8116611	182705264	2625501	12737120
COST SAVINGS CASES ONLY	4348	10762	8474195	159354560	2426266	11755378
EMISSIONS SAVINGS CASE ONLY	4699	12921	8134260	182335776	17099904	14081050
FUEL & COST SAVINGS CASES	4348	10762	8474195	159354560	2426266	11755378
FUEL, COST & EMISSION SAVING	4348	10762	8474195	159354560	2426266	11755378
						14181648

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL FUEL	
	NATURAL PETROLEUM GAS	DISTILLATE FUEL	PETROLEUM BOILER FUEL	COAL DERIVED GAS	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14769	-425	6082	0	6138	2197
FUEL SAVINGS CASES ONLY	6206	-425	3499	0	-236	1501
COST SAVINGS CASES ONLY	5892	-408	3397	0	-198	1357
EMISSIONS SAVINGS CASE ONLY	14697	-425	6078	0	6139	2119
FUEL & COST SAVINGS CASES	5892	-408	3397	0	-198	1357
FUEL, COST & EMISSION SAVING	5892	-408	3397	0	-193	1357

SITE PLUS UTILITY

TOTAL -- ALL	4703	12934	8116611	182705264	17098992	31173664
FUEL SAVINGS CASES ONLY	4703	11050	8116611	182705264	2625501	12737120
COST SAVINGS CASES ONLY	4348	10762	8474195	159354560	2426266	11755378
EMISSIONS SAVINGS CASE ONLY	4699	12921	8134260	182335776	17099904	14081050
FUEL & COST SAVINGS CASES	4348	10762	8474195	159354560	2426266	11755378
FUEL, COST & EMISSION SAVING	4348	10762	8474195	159354560	2426266	11755378

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	9775	-425	3056	0	0	8964	2197	5551
FUEL SAVINGS CASES ONLY	1212	-425	672	0	0	2590	1501	5551
COST SAVINGS CASES ONLY	970	-408	575	0	0	2733	1357	5227
EMISSIONS SAVINGS CASE ONLY	9775	-425	3056	0	0	9069	2119	5579
FUEL & COST SAVINGS CASES	970	-408	575	0	0	2733	1357	5227
FUEL, COST & EMISSION SAVING	970	-408	575	0	0	2733	1357	5227

Power Systems Division

FCR-1333

INDUSTRY	CYAS GENERAL SUMMARY - PROCESS LEVEL				NO. 12 ADVANCED TECHNOLOGY-SPINNING ENGINE-COAL DERIVED BOILER GRADE				STRATEGY MATCH-Y				EMISSIONS SAVINGS				ECS	
	FUEL ENERGY	SAVINGS	RATIO	UTIL. FUEL	TOTAL FUEL	SAVINGS	RATIO	UTIL. FUEL	COST \$600	SAVINGS \$600	RATIO	PLANT	EMISSIONS	SAVINGS	PLANT	EMISSIONS	SAVINGS	SAVINGS
NO. 01 MEAT PACKING	0.354	90.1	197.6	-0.604	-235021	-235021	0.534	2503610	0.534	-70674	211352	132670	17.85					
NO. 02 DANNING	0.209	34.0	130.2	-2.134	-304314	-304314	0.470	1703910	0.470	-75351	147851	72499	1.21					
NO. 03 MALT BEVERAGE	0.110	13.3	68.5	-0.531	-139950	-139950	0.300	821051	0.300	-40713	73262	32540	3.93					
NO. 04 MENCH FABRIC MILL	0.260	72.4	246.2	-0.653	-330219	-330219	0.405	2354541	0.405	-127100	265617	110236	5.70					
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	0	0.000	14469	93163	112632	0.00					
NO. 06 HEMLOCK MILL	0.275	70.4	227.6	-0.450	-146007	-146007	0.491	1513970	0.491	-112000	239631	127551	27.92					
NO. 07 WRITING PAPER MILL	0.270	132.0	439.0	-1.353	-664935	-664935	0.409	3487275	0.409	-260670	552137	291467	29.00					
NO. 08 CORRUGATED PAPER	0.174	115.2	300.5	-0.140	-270776	-270776	0.341	3260129	0.341	-101090	303519	202420	25.91					
NO. 09 BOX BOARD	0.160	32.5	97.6	-0.079	-45429	-45429	0.345	900453	0.345	-47921	103496	55576	25.04					
NO. 10 CHLORINE	0.293	391.7	1012.7	-0.409	-1014476	-1014476	0.495	8324593	0.495	-603977	1313992	710015	26.47					
NO. 11 ALUMINA	0.041	5.9	65.2	-0.265	-117112	-117112	0.211	606020	0.211	-43950	69803	25946	20.83					
NO. 12 LOW DENS. POLYETHYL	0.263	63.8	235.0	-0.230	-146013	-146013	0.405	1600917	0.405	-121287	252374	131206	20.09					
NO. 13 HT DENS. POLYETHYL	0.263	60.2	206.5	-0.863	-242414	-242414	0.405	1424939	0.405	-106200	221252	115052	23.14					
NO. 14 POLYETHYL CHLORIDE	0.263	109.9	370.6	-1.130	-477704	-477704	0.405	2607343	0.405	-77784	402751	209493	22.05					
NO. 15 STYRENE-DUT. RUB.	0.111	3.3	15.0	-0.352	-20340	-20340	0.270	169335	0.270	-8043	16130	7207	5.54					
NO. 16 NULON	0.262	21.0	72.0	-0.774	-62459	-62459	0.404	510458	0.404	-36969	77101	40212	13.75					
NO. 17 STYRENE	0.003	0.0	7.0	0.000	0	0	0.000	0	0.000	104155	7532	111667	0.00					
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	0	0.000	700461	16620	797028	0.00					
NO. 19 PETROLFUM REFINING	0.050	209.4	920.9	-0.117	-1726292	-1726292	0.130	10215320	0.130	-502808	1069250	486371	25.36					
NO. 20 TIRES	0.263	142.0	406.4	-1.340	-745297	-745297	0.405	4047344	0.405	-249564	520491	270927	27.03					
NO. 23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	0	0.000	4362760	521014	4044502	0.00					
NO. 24 CRAY IRON FOUNDRY	0.033	5.9	14.3	-0.015	-8086	-8086	0.054	145944	0.054	-7963	15259	7297	2.91					
NO. 25 COPPER	0.263	205.4	703.6	-1.656	-973907	-973907	0.405	4847269	0.405	-361656	752960	301313	20.09					
NO. 26 MOTOR VEHICLE	0.254	205.0	773.7	-1.670	-1264934	-1264934	0.405	6955015	0.405	-397630	820522	430092	25.77					
TOTAL -- ALL		2000	7540		-9031139	-9031139		55012592		1603076	8161177	9765049						
FUEL SAVINGS CASES ONLY		2000	6933		-9031139	-9031139		53012592		-3637975	7517041	3979061						
COST SAVINGS CASES ONLY		0	0		0	0		0		0	0	0						
EMISSIONS SAVINGS CASE ONLY		0	602		0	0		0		5241052	644137	5085939						
FUEL & COST SAVINGS CASES		0	0		0	0		0		0	0	0						
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0		0	0	0						

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

*** STRATEGY MATCH-7

YEAR : 1990

10.12 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL DERIVED BOILER GRADE

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10-12 DTU	10-12 DTU	10-12 DTU	10-12 DTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	7963	27970			-33637104	212906256			145010	31117920
FUEL SAVINGS CASES ONLY	7963	26715			-33637104	212906256			-14320479	29700304
COST SAVINGS CASES ONLY	0	0			0	0			0	0
EMISSIONS SAVINGS CASE ONLY	0	1254			0	0			14473494	1337551
FUEL & COST SAVINGS CASES	0	0			0	0			0	0
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10-12 DTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	BOILER FUEL	GAS	DISTILLATE	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14769	-425	6082	0	0	-30974	34530	2197
FUEL SAVINGS CASES ONLY	6069	-425	3499	0	0	-30974	25156	1501
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	3563	0	2584	0	0	0	6374	694
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14769	-425	6082	0	0	-30974	34530	2197	7963
FUEL SAVINGS CASES ONLY	6069	-425	3499	0	0	-30974	25156	1501	7963
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	3563	0	2584	0	0	0	6374	694	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COIL FUEL CONVERSION

TOTAL -- ALL	3563	0	2584	0	0	0	3530	2197	-1335
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	-2036	1501	-1335
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	8563	0	2584	0	0	0	6374	694	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INDUSTRY	CTAS GENERAL SUMMARY - PROCESS LEVEL				*** STRATEGY MATCH-T				EMISSIONS SAVINGS			ECS SIZE (MM)
	NO. 33 ADVANCED TECHNOLOGY STEELING ENGINE-COALFED	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST DOLLARS RATIO	SAVINGS DOLLARS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	TOTAL	
NO. 01 MEAT PACKING	0.043	0.015	304.4	0.000	-0.000	-346497	4622464	0.446	-163783	325661	161878	28.08
NO. 02 BAKING	-0.092	-3.9	16.1	0.460	-0.460	-65648	650641	0.095	-16691	19330	2449	0.17*
NO. 03 MALT BEVERAGE	0.036	4.5	73.3	0.333	-0.333	-85054	1354445	0.216	-53809	78367	24559	4.33
NO. 04 WOVEN FABRIC MILL	0.161	70.4	403.5	-1.160	-1.160	-400082	4971137	0.400	-254749	437082	182332	9.70
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0	0.000	14469	93163	112632	0.00
NO. 06 LENS PRINT MILL	0.067	8.0	34.6	0.082	0.082	40232	432431	0.134	-20845	36450	15604	26.18
NO. 07 WRITING PAPER MILL	0.105	12.5	66.6	0.128	0.128	62772	1046177	0.263	-50379	83977	33598	20.43
NO. 08 CORRUGATED PAPER	0.123	91.9	366.9	0.107	0.107	200313	4426441	0.274	-225767	390164	164397	27.19
NO. 09 FLEX BOARD	0.135	24.6	93.0	0.149	0.149	85919	1220087	0.283	-58201	103926	45724	25.93
NO. 10 CHLORINE	0.190	386.0	1866.8	-0.371	-0.371	-921490	15438643	0.415	-1133218	2022764	889546	27.71
NO. 11 ALUMINA	-0.006	-0.9	67.6	-0.076	-0.076	-33549	841716	0.150	-53545	72356	18811	22.24
NO. 12 LOW DENS. POLYETHYL	0.174	69.0	364.1	-0.216	-0.216	-137933	3060304	0.408	-223368	389619	166251	29.43
NO. 13 HI DENS. POLYETHYL	0.174	59.5	319.7	-0.818	-0.818	-235915	2660062	0.408	-195707	341441	145734	27.29
NO. 14 POLYETHYL CHLORIDE	0.174	103.8	582.3	-1.083	-1.083	-457878	4305136	0.408	-356922	622709	265737	26.04
NO. 15 STYRENE BUT. RUB.	0.048	1.5	16.0	-0.189	-0.189	-13639	262659	0.205	-11548	17111	5563	6.08
NO. 16 NYLON	0.174	20.9	111.7	-0.781	-0.781	-83217	996265	0.407	-68622	119787	51165	21.75
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0	0.000	104155	7532	111637	0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0	0.000	780461	16628	797089	0.00
NO. 19 PETROLEUM REFINING	0.021	103.2	1009.6	0.266	0.266	3923613	14456436	0.083	-770571	1080655	310084	26.26
NO. 20 TILES	0.050	6.6	76.9	-0.049	-0.049	-19930	1337221	0.226	-55159	82293	27156	8.83
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0	0.000	4342768	521814	4864502	0.00
NO. 24 GRAY IRON FOUNDRY	0.012	1.8	13.5	0.156	0.156	103596	263217	0.027	-10886	14402	3716	2.78
NO. 25 COPPER	0.049	9.2	111.6	-0.017	-0.017	-7201	1711192	0.222	-80340	119335	38545	7.11
NO. 26 MOTOR VEHICLE	0.049	11.3	121.0	-0.042	-0.042	-61667	2210149	0.228	-86469	129566	43077	12.49
TOTAL -- ALL		1063	6632			1492640	67050332		1350788	7131176	8481959	
FUEL SAVINGS CASES ONLY		1018	5844			1521837	6554490		-3920638	6395355	2574710	
COST SAVINGS CASES ONLY		232	189			4415444	21844784		-1136449	1709573	573124	
EMISSIONS SAVINGS CASE ONLY		0	602			0	0		5041652	644137	5685989	
FUEL & COST SAVINGS CASES		232	189			4416444	21844784		-1136449	1709573	573124	
FUEL, COST & EMISSIONS SAVING		0	0			0	0		0	0	0	

COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 33 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL (AFB)

07

*** STRATEGY MATCH-T

CATEGORY	TOTAL FUEL SAVINGS 10*12 BTU	UTILITY FUEL SAVINGS 10*12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS --- TONS PER YEAR --- PLANT UTILITY TOTAL
TOTAL -- ALL	3406	2019	1568950	207012976	2145066 2203080 24192160
FUEL SAVINGS CASES ONLY	3423	18400	2042300	197644704	-11740283 19911792 8171512
COST SAVINGS CASES ONLY	941	5157	10419766	73262816	-3716425 5907791 2191366
EMISSIONS SAVINGS CASE ONLY	0	1254	0	0	14473494 1337551 15311046
FUEL & COST SAVINGS CASES	941	5307	10419766	73262816	-3716425 5907791 2191366
FUEL, COST & EMISSION SAVING	0	0	0	0	0 0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM DISTILLATE	FUEL SAVINGS	COAL SAVINGS	OTHER SAVINGS	TOTAL FUEL SAVINGS
TOTAL -- ALL	14768	-425	6092	0	-1001	2197 3406
FUEL SAVINGS CASES ONLY	5733	-17	3097	0	-6928	1489 3423
COST SAVINGS CASES ONLY	4994	0	2534	0	-8266	1367 941
EMISSIONS SAVINGS CASE ONLY	3583	0	2534	0	6374	696 0
FUEL & COST SAVINGS CASES	4994	0	2534	0	-8266	1367 941
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0 0

SITE PLUS UTILITY

TOTAL -- ALL	14768	-425	6092	0	-1001	2197 3406
FUEL SAVINGS CASES ONLY	5733	-17	3097	0	-6928	1489 3423
COST SAVINGS CASES ONLY	4994	0	2534	0	-8266	1367 941
EMISSIONS SAVINGS CASE ONLY	3583	0	2534	0	6374	696 0
FUEL & COST SAVINGS CASES	4994	0	2534	0	-8266	1367 941
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0 0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14768	-425	6092	0	-1001	2197 3406
FUEL SAVINGS CASES ONLY	5733	-17	3097	0	-6928	1489 3423
COST SAVINGS CASES ONLY	4994	0	2534	0	-8266	1367 941
EMISSIONS SAVINGS CASE ONLY	3583	0	2534	0	6374	696 0
FUEL & COST SAVINGS CASES	4994	0	2534	0	-8266	1367 941
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0 0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY MATCH-T				EMISSIONS SAVINGS				01	
NO. 34 ADVANCED TECHNOLOGY, MECHANICAL, LOCAL										CAPITAL		EMISSIONS		PLANT		UTILITY		ECS	
INDUSTRY	FUEL ENERGY		TOTAL		DEVELOP BOILER GRADE		SAVINGS		DOLLARS	SAVINGS		RATIO		SAVINGS		TOTAL		SIZE	
	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO		SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO
NO. 01 MEAT PACKING	0.009	0.009	22.0	36.7	-0.093	-32391	0.000	0.000	0	1040629	0.310	-11748	39234	27487	3.29				
NO. 02 BAKING	0.095	0.095	3.8	6.3	-0.093	-14001	0.000	0.000	0	141913	0.206	-1991	6791	4801	0.05*				
NO. 03 MALT BEVERAGE	0.240	0.240	20.8	34.4	-0.054	-14172	0.000	0.000	0	601142	0.362	-10694	36787	26093	1.92				
NO. 04 WOVEN FABRIC MILL	0.091	0.091	9.6	21.0	-0.029	-11520	0.000	0.000	0	427862	0.136	-8569	22479	13910	0.48*				
NO. 05 SAW MILL	0.000	0.000	0.0	91.7	0.000	0	0.000	0.000	0	0	0.000	14469	99163	112632	0.00				
NO. 06 NEWSPRINT MILL	0.093	0.093	11.7	20.5	0.027	11953	0.000	0.000	0	288673	0.129	-6612	21550	14938	14.65				
NO. 07 PULPING PAPER MILL	0.191	0.191	21.3	37.6	0.050	24534	0.000	0.000	0	652645	0.277	-14694	47337	32643	10.87				
NO. 08 CORRUGATED PAPER	0.244	0.244	125.1	212.5	0.076	141834	0.000	0.000	0	2823355	0.363	-67689	226020	158331	44.69				
NO. 09 BOX BOARD	0.216	0.216	33.5	59.3	0.064	36618	0.000	0.000	0	814393	0.320	-19815	62929	43114	29.74				
NO. 10 CHLORINE	0.145	0.145	97.3	99.7	0.078	194137	0.000	0.000	0	1456113	0.155	-5483	108051	102568	8.46				
NO. 11 ALUMINA	0.109	0.109	12.3	33.8	-0.021	-9233	0.000	0.000	0	465178	0.220	-16511	36154	19644	15.62				
NO. 12 LOW DENS. POLYETHYL	0.063	0.063	10.9	18.0	0.013	8202	0.000	0.000	0	286181	0.077	-5638	19272	13634	2.08				
NO. 13 HI DENS. POLYETHYL	0.116	0.116	8.8	16.6	0.013	3512	0.000	0.000	0	257759	0.160	-6091	17833	11731	2.72				
NO. 14 POLYVINYL CHLORIDE	0.142	0.142	16.3	30.2	0.017	7220	0.000	0.000	0	469619	0.199	-10839	32295	21456	2.58				
NO. 15 STYRENE-EUT. RUB.	0.216	0.216	4.8	7.7	-0.031	-2326	0.000	0.000	0	128386	0.319	-2414	8255	5841	2.76				
NO. 16 NYLON	0.105	0.105	3.0	6.2	0.001	56	0.000	0.000	0	102049	0.152	-2424	6679	4255	1.16				
NO. 17 STYRENE	0.000	0.000	0.0	7.0	0.000	0	0.000	0.000	0	0	0.000	104155	7532	111687	0.00				
NO. 18 ETHYLENE	0.000	0.000	0.0	16.2	0.000	0	0.000	0.000	0	0	0.000	780461	16628	797088	0.00				
NO. 19 PETROLEUM REFINING	0.000	0.000	0.0	293.3	0.000	0	0.000	0.000	0	0	0.000	2613494	313958	2984452	0.00				
NO. 20 TILES	0.203	0.203	22.8	37.2	0.025	10040	0.000	0.000	0	682121	0.292	-11274	39755	25481	4.01				
NO. 23 INTEGRATED STEEL	0.000	0.000	0.0	487.4	0.000	0	0.000	0.000	0	0	0.000	4342768	521814	4864582	0.00				
NO. 24 GRAY IRON FOUNDRY	-0.031	-0.031	-4.9	39.6	-0.178	-99167	0.000	0.000	0	622960	0.061	-34024	42351	8327	8.04				
NO. 25 COPPER	0.203	0.203	32.5	54.1	0.039	23033	0.000	0.000	0	842162	0.284	-17462	57873	40411	3.24				
NO. 26 MOTOR VEHICLE	0.166	0.166	35.0	60.3	-0.037	-27661	0.000	0.000	0	1157180	0.278	-20049	64622	44573	5.87				
TOTAL -- ALL			437	1727		250863				13261417		7638324	1854351	9492676					
FUEL SAVINGS CASES ONLY			492	792		350030				12630457		-239997	853906	613910					
COST SAVINGS CASES ONLY			393	592		461253				6075569		-169022	635584	471562					
EMISSIONS SAVINGS CASE ONLY			0	896		0				0		7912346	953095	8376441					
FUEL & COST SAVINGS CASES			303	592		461253				6075569		-168022	639584	471562					
FUEL, COST & EMISSION SAVING			0	0		0				0		0	0	0					

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1970

NO. 34 ADVANCED TECHNOLOGY, THERMICHICS, COAL DERIVED BOILER GRADE

*** STRATEGY MATCH-T

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$		CAPITAL COST \$000		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
ALL	1660	5315			1304155	53799552	18376576	5778359	24154928	
FUEL SAVINGS CASES ONLY	1939	5423			1574239	52605456	-11150527	3757834	2607306	
COST SAVINGS CASES ONLY	1663	2731			1871937	40699723	-865996	3017283	2151291	
EMISSIONS SAVINGS CASE ONLY	0	1817			0	0	19592320	1939349	21531664	
FUEL & COST SAVINGS CASES	1663	2731			1871987	40699728	-865996	3017283	2151291	
FUEL, COST & EMISSION SAVING	0	0			0	0	0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
ALL	1660	5315			1304155	53799552	18376576	5778359
FUEL SAVINGS CASES ONLY	1939	5423			1574239	52605456	-11150527	3757834
COST SAVINGS CASES ONLY	1663	2731			1871937	40699723	-865996	3017283
EMISSIONS SAVINGS CASE ONLY	0	1817			0	0	19592320	1939349
FUEL & COST SAVINGS CASES	1663	2731			1871987	40699728	-865996	3017283
FUEL, COST & EMISSION SAVING	0	0			0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
ALL	1679	5325			1304155	53799552	18376576	5778359
FUEL SAVINGS CASES ONLY	1939	5423			1574239	52605456	-11150527	3757834
COST SAVINGS CASES ONLY	1663	2731			1871937	40699723	-865996	3017283
EMISSIONS SAVINGS CASE ONLY	0	1817			0	0	19592320	1939349
FUEL & COST SAVINGS CASES	1663	2731			1871987	40699728	-865996	3017283
FUEL, COST & EMISSION SAVING	0	0			0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
ALL	12345	4378			7928	2197	190	796
FUEL SAVINGS CASES ONLY	0	0			0	0	0	0
COST SAVINGS CASES ONLY	0	0			0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0			0	0	0	0
FUEL & COST SAVINGS CASES	0	0			0	0	0	0
FUEL, COST & EMISSION SAVING	0	0			0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL													
NO. 35 ADVANCED TECHNOLOGY, PULP, PAPER, CHEMICALS, COAL		DEP. B.G. (COMP. CONFIG.)											
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		COST SAVINGS		*** STRATEGY MATCH-T		CAPITAL COST		EMISSIONS SAVINGS		ECS SIZE (MM)
	SAVINGS	RATIO	SAVINGS	RATIO	\$000	RATIO	SAVINGS	RATIO	\$000	PLANT	UTILITY	TOTAL	
NO.01 MEAT PACKING	0.209	28.7	80.8	-0.392	-152712	1937849	0.386	-30708	86438	47730	7.29		
NO.02 BAKING	0.002	0.1	9.3	-0.313	-44677	305457	0.134	-6840	9967	3127	0.084		
NO.03 MALT BEVERAGE	0.141	16.7	66.2	-0.407	-128247	1060767	0.322	-36632	70862	34230	3.74		
NO.04 KOVEN FABRIC MILL	-0.009	-1.0	6.1	-0.069	-26869	224449	0.009	-5525	6498	973	0.144		
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00		
NO.06 NEWSPRINT MILL	0.179	21.5	84.1	-0.025	-10710	771034	0.376	-44889	83595	43706	61.69		
NO.07 WRITING PAPER MILL	0.252	33.7	81.3	-0.010	-5060	1034830	0.419	-41264	102312	61048	23.87		
NO.08 CORRUGATED PAPER	0.286	240.3	539.2	-0.083	-156298	4919926	0.451	-219564	573617	354052	76.76		
NO.09 BOX BOARD	0.205	66.0	148.8	-0.035	-20391	1343591	0.451	-60577	157791	97214	75.65		
NO.10 CHLORINE	0.195	130.2	374.3	0.017	43034	3754162	0.339	-182236	405597	223361	32.53		
NO.11 ALUMINA	0.130	28.2	138.7	-0.459	-202925	1285942	0.336	-80800	148499	67699	66.13		
NO.12 LOW DENS. POLYETHYL	0.071	12.4	67.7	-0.081	-51782	859612	0.181	-40460	72473	32013	8.03		
NO.13 HI DENS. POLYETHYL	0.156	12.9	59.8	-0.151	-42405	708581	0.371	-34349	64036	29687	10.01		
NO.14 POLYVINYL CHLORIDE	0.151	22.7	103.7	-0.277	-117171	1309861	0.367	-62916	116296	53380	9.51		
NO.15 STYRENE-PUT. RUB.	0.143	6.5	29.3	-0.770	-55645	373169	0.352	-16831	31415	14585	10.75		
NO.16 NITRO	0.032	0.9	17.8	-0.251	-26731	273759	0.242	-12356	19135	6779	3.41		
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00		
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00		
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00		
NO.20 TILES	0.169	33.4	144.4	-0.502	-227600	1971242	0.382	-80991	154505	73514	15.97		
NO.23 INTEGRATED STEEL	0.000	0.0	467.4	0.000	0	0	0.000	4342768	521814	4864582	0.00		
NO.24 GRAY IRON FOUNDRY	0.129	20.0	67.4	-0.053	-29684	816237	0.265	-36154	72071	35917	13.63		
NO.25 COPPER	0.162	46.0	205.7	-0.493	-289703	2418844	0.375	-117213	220078	102865	12.61		
NO.26 MOTOR VEHICLE	0.164	57.1	233.2	-0.509	-385840	3214155	0.390	-128959	249717	120759	23.19		

TOTAL -- ALL		776	3359		-1931412	28503280		6665091	3607991	10273076			
FUEL SAVINGS CASES ONLY		777	2457		-1904543	28278832		-1241737	2643399	1401663			
COST SAVINGS CASES ONLY		130	374		43034	5754162		-182236	405597	223361			
EMISSIONS SAVINGS CASE ONLY		0	896		0	0		7912346	958095	8870441			
FUEL & COST SAVINGS CASES		130	374		43034	3754162		-182236	405597	223361			
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0			

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1900

1.3.35 ADVANCED TECHNOLOGY, THERMOCHEMICAL DER. B.G. (COUP. CONFIG.)

*** STRATEGY MATCH-T

CATEGORY	TOTAL FUEL SAVINGS		TOTAL UTILITY		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	FUEL	SAVINGS	DOLLARS	\$000	\$000	\$000	PLANT	TONS PER YEAR
TOTAL -- ALL	3333	12351			-6927353		114557034		14215725	13621310
FUEL SAVINGS CASES ONLY	3334	10533			-6876356		114126800		-5368001	11469515
COST SAVINGS CASES ONLY	293	842			96817		8446028		-409939	912503
EMISSIONS SAVINGS CASE ONLY	0	1517			0		0		19592320	1939349
FUEL & COST SAVINGS CASES	293	842			96817		8446028		-409989	912503
FUEL, COST & EMISSION SAVINGS	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	COAL	OTHER	
TOTAL -- ALL	14768	-425	6032	0	-12159	19921	2197	3333
FUEL SAVINGS CASES ONLY	2405	-425	1637	0	-12093	11573	189	3334
COST SAVINGS CASES ONLY	104	0	47	0	-931	1073	0	293
EMISSIONS SAVINGS CASE ONLY	12345	0	4373	0	0	7324	2005	0
FUEL & COST SAVINGS CASES	104	0	47	0	-931	1073	0	293
FUEL, COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14768	-425	6032	0	-12159	19921	2197	3333
FUEL SAVINGS CASES ONLY	2405	-425	1637	0	-12093	11573	189	3334
COST SAVINGS CASES ONLY	104	0	47	0	-931	1073	0	293
EMISSIONS SAVINGS CASE ONLY	12345	0	4373	0	0	7324	2005	0
FUEL & COST SAVINGS CASES	104	0	47	0	-931	1073	0	293
FUEL, COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	12345	0	4378	0	0	6841	2197	-292
FUEL SAVINGS CASES ONLY	0	0	0	0	0	-465	163	-277
COST SAVINGS CASES ONLY	0	0	0	0	0	-41	0	-41
EMISSIONS SAVINGS CASE ONLY	12345	0	4378	0	0	7324	2005	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	-41	0	-41
FUEL, COST & EMISSION SAVINGS	0	0	0	0	0	0	0	0

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TABLE VI-5
SUMMARY RESULTS
OPTIMUM MATCH STRATEGY

CTAS GENERAL SUMMARY - PROCESS LEVEL										01		
NO. 1 CURRENT TECHNOLOGY, STEAM TURBINE, 15 PSI/MENT, PET. B.G.										ECS		
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		COST SAVINGS		DOLLARS		*** STRATEGY OPTIMUM	EMISSIONS SAVINGS		
	SAVINGS	FUEL	SAVINGS	RATIO	RATIO	RATIO	SAVINGS	SAVINGS		PLANT	UTILITY	TOTAL
	RATIO	SAVINGS	SAVINGS	RATIO	RATIO	RATIO	\$000	\$000		TONS PER YEAR	UTILITY	TOTAL
NO.01 MEAT PACKING	0.121	12.7	25.9	-0.026			-10287	542650	0.214	-9554	27710	18156 2.43
NO.02 BAKING	0.051	2.0	4.1	-0.144			-20509	151377	0.129	-1566	4417	2911 0.04*
NO.03 MALT BEVERAGE	0.155	11.8	24.1	-0.005			-1277	348363	0.297	-8723	25768	17065 1.41
NO.04 KOVEN FAERIC MILL	0.008	0.9	2.9	-0.025			-9799	130039	0.014	-1711	3078	1366 0.07*
NO.05 SAW MILL	0.161	18.1	3.6	0.093			42639	1090632	0.116	9028	3847	12875 0.01*
NO.06 NEWSPRINT MILL	0.049	5.7	13.8	0.024			10425	116756	0.079	-5551	14576	9025 10.32
NO.07 WRITING PAPER MILL	0.113	12.6	25.6	0.061			29812	289704	0.190	-10717	32276	21520 7.70
NO.08 CORRUGATED PAPER	0.200	101.0	192.9	0.140			263028	1117594	0.347	-63678	265220	141541 42.07
NO.09 BOX BOARD	0.176	27.2	52.6	0.120			66734	345202	0.293	-17517	55805	3 289 27.31
NO.10 CHLORINE	0.070	46.8	37.7	0.049			121867	484107	0.067	2616	40848	43463 3.35
NO.11 ALUMINA	-0.050	-5.5	5.2	-0.065			-26003	100846	-0.027	-7890	5610	-2280 2.39
NO.12 LOW DENS. POLYETHYL	0.001	0.2	5.6	-0.018			-11323	122902	0.012	-3929	5959	2030 0.68
NO.13 HI DENS. POLYETHYL	0.012	0.9	2.1	-0.011			-3065	67438	0.015	-1146	2198	1052 0.35*
NO.14 POLYVINYL CHLORIDE	0.013	1.5	2.8	-0.010			-4289	162236	0.013	-1549	2941	1394 0.24*
NO.15 STYRENE-BUT. RUB.	0.065	1.2	2.2	-0.010			-745	48045	0.103	-930	2340	1411 0.82
NO.16 NYLON	0.014	0.4	0.8	-0.007			-713	26660	0.018	-343	834	491 0.15*
NO.17 STYRENE	0.099	22.3	46.1	-0.066			-44772	352919	0.221	-17701	49280	31579 20.93
NO.18 ETHYLENE	0.028	32.9	21.6	-0.005			-20677	549597	0.014	-12217	22205	987 3.66
NO.19 PETROLEUM REFINING	0.029	115.1	74.3	0.000			-1744	1735940	0.016	-36736	79510	42774 5.02
NO.20 TIRES	0.020	2.2	4.2	-0.013			-5169	162613	0.026	-2048	4451	2403 0.46*
NO.23 INTEGRATED STEEL	-0.001	-6.4	21.2	-0.001			-8237	2674424	0.002	-11663	22713	11651 3.66
NO.24 GRAY IRON FOUNDRY	0.009	1.2	2.6	-0.020			-10910	68121	0.001	-2622	2770	148 0.58*
NO.25 COPPER	0.020	3.3	6.1	-0.016			-9524	203930	0.022	-3530	6509	2979 0.36*
NO.26 MOTOR VEHICLE	0.018	3.7	6.9	-0.052			-39147	256942	0.024	-3667	7424	3757 0.70
TOTAL -- ALL		412	955				305555	11098023		-212692	628269	415537
FUEL SAVINGS CASES ONLY		404	955				342545	8322759		-193729	599446	406217
COST SAVINGS CASES ONLY		211	316				52545	3443995		-85318	352532	266713
EMISSIONS SAVINGS CASE ONLY		65	41				164506	1574739		11644	44685	52338
FUEL & COST SAVINGS CASES		211	316				52545	3443995		-85318	352532	266713
FULL, COST & EMISSION SAVINGS		25	41				164506	1574739		11644	44685	56338

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 1 CURRENT TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT.), PET. B.G.

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	PLANT	UTILITY	PLANT	UTILITY	PLANT	UTILITY	PLANT	UTILITY
TOTAL -- ALL	1501	2455			1376741		35437424		-979696	2681937
FUEL SAVINGS CASES ONLY	1571	2360			1690957		29266272		-876742	2580279
COST SAVINGS CASES ONLY	935	1682			2310306		15197726		-550371	1861662
EMISSIONS SAVINGS CASE ONLY	140	92			355903		3176666		23190	99272
FUEL & COST SAVINGS CASES	935	1682			2310306		15197726		-550371	1861662
FUEL, COST & EMISSION SAVING	140	92			355903		3176666		23190	99272

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE
TOTAL -- ALL	14654	-425	-16165	0	0	1240
FUEL SAVINGS CASES ONLY	14765	-17	-16579	0	0	3856
COST SAVINGS CASES ONLY	1260	0	-2051	0	0	2513
EMISSIONS SAVINGS CASE ONLY	119	0	-318	0	0	325
FUEL & COST SAVINGS CASES	1260	0	-2051	0	0	2513
FUEL, COST & EMISSION SAVING	119	0	-318	0	0	325

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE
TOTAL -- ALL	14654	-425	-16165	0	0	1240
FUEL SAVINGS CASES ONLY	14765	-17	-16579	0	0	3856
COST SAVINGS CASES ONLY	1260	0	-2051	0	0	2513
EMISSIONS SAVINGS CASE ONLY	119	0	-318	0	0	325
FUEL & COST SAVINGS CASES	1260	0	-2051	0	0	2513
FUEL, COST & EMISSION SAVING	119	0	-318	0	0	325

CIAS GENERAL SUMMARY - PROCESS LEVEL

NO. 2 CURRENT TECHNOLOGY, STEAM TURBINE, 615 PSIA (EXT.), COAL	INDUSTRY	FUEL ENERGY TOTAL			UTILITY			SAVINGS			*** STRATEGY OPTIMUM			EMISSIONS SAVINGS			ECS SIZE (FW)
		SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL	DOLLARS \$000	DOLLARS \$000	DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT TOTAL	TONS PER YEAR	UTILITY TOTAL	PLANT TOTAL	
NO. 01 MEAT PACKING		0.079	8.3	25.8	-0.050			-19497			1456741	-0.077	-34376	27576		-6800	2.45
NO. 02 BAKING		0.035	1.4	4.0	-0.115			-16459			256067	-0.045	-5297	4253		-1045	0.04*
NO. 03 MALT BEVERAGE		0.107	8.2	24.6	0.062			16294			980124	-0.103	-32654	26332		-6322	1.46
NO. 04 HOVEN FABRIC MILL		-0.007	-0.9	2.8	-0.001			-329			409690	-0.023	-5392	3030		-2362	0.07*
NO. 05 SAW MILL		0.153	17.2	3.1	-0.757			-397438			4930083	0.099	7896	3277		11173	0.01*
NO. 06 NEWSPRINT MILL		0.027	3.2	13.6	0.075			32751			336997	-0.042	-19266	14362		-4904	10.53
NO. 07 WITTING PAPER MILL		0.054	6.0	25.4	0.132			64604			825028	-0.098	-43515	31997		-11518	7.92
NO. 08 CORRUGATED PAPER		0.136	69.0	201.3	0.237			538789			3170897	-0.083	-249659	214150		-35510	45.35
NO. 09 BUA CORPO		0.150	23.2	21.8	0.160			91751			1041781	-0.038	-28293	23144		-5149	13.37
NO. 10 CHLORINE		0.054	36.2	36.5	0.091			225995			1453279	0.003	-37425	39539		2114	3.31
NO. 11 ALUMINA		-0.078	-8.7	5.9	0.035			15403			313693	-0.118	-16649	6306		-10343	2.79
NO. 12 LOH DENS. POLYETHYL		-0.009	-1.5	5.4	0.008			5176			360362	-0.021	-9555	5768		-3787	0.67
NO. 13 HI DENS. POLYETHYL		-0.006	-0.4	2.0	0.037			10465			239461	-0.023	-3828	2113		-1715	0.35*
NO. 14 POLYVINYL CHLORIDE		-0.010	-1.1	2.7	0.049			20884			402015	-0.027	-5790	2876		-2914	0.24*
NO. 15 STYRENE-BUT. RUB.		0.025	0.5	2.2	0.076			5483			142802	-0.069	-3322	2324		-999	0.83
NO. 16 NYLON		-0.004	-0.1	0.8	0.039			4150			89058	-0.020	-1372	821		-551	0.15*
NO. 17 STYRENE		0.037	8.4	44.3	0.161			109164			964651	-0.112	-64337	47426		-16911	20.82
NO. 18 ETHYLENE		-0.001	-1.4	20.8	0.356			1443614			1814905	-0.043	-55678	21385		-34293	3.30
NO. 19 PETROLEUM REFINING		-0.004	-14.6	77.3	0.340			5015976			5522032	-0.041	-206206	82726		-123480	5.09
NO. 20 TIRES		-0.011	-1.2	4.1	0.049			19896			612904	-0.038	-8044	4361		-3684	0.47*
NO. 23 INTEGRATED STEEL		-0.003	-14.4	20.3	-0.011			-118132			3544022	-0.001	-25841	21695		-4145	3.60
NO. 24 GRAY IRON FOUNDRY		-0.010	-1.6	2.6	0.173			96422			187465	-0.027	-6423	2796		-3627	0.57*
NO. 25 COPPER		-0.011	-1.7	6.0	0.062			36691			772659	-0.042	-12401	6377		-6024	0.39*
NO. 26 MOTOR VEHICLE		-0.009	-1.8	6.9	0.006			4435			936016	-0.039	-13698	7386		-6312	0.72
TOTAL -- ALL			132	560				7216094			30762638		-891126	602020		-279106	
FUEL SAVINGS CASES ONLY			122	403				561437			15558447		-510249	434300		-75069	
COST SAVINGS CASES ONLY			121	504				7757941			20160096		-818116	542189		-275927	
EMISSIONS SAVINGS CASE ONLY			17	3				-397438			4930083		7896	3277		11173	
FUEL & COST SAVINGS CASES			155	370				1004831			6915557		-478472	399274		-79198	
FUEL, COST & EMISSION SAVING			0	0				0			0		0	0		0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 2 CURRENT TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT), COAL

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL UTILITY			COST SAVINGS		CAPITAL COST \$000	EMISSIONS SAVINGS		
	FUEL	SAVINGS	10**12 BTU	DOLLARS \$000	10**12 BTU		PLANT	UTILITY	TOTAL
TOTAL -- ALL	509	2350		24953240	101599336		-3738798	2571102	-1167707
FUEL SAVINGS CASES ONLY	685	1852		4163822	56466928		-2519867	2044142	-475778
COST SAVINGS CASES ONLY	406	2243		25896890	81278304		-3618019	2456417	-1161613
EMISSIONS SAVINGS CASE ONLY	33	6		-742045	9450034		15136	6281	21417
FUEL & COST SAVINGS CASES	643	1789		4975390	43733760		-2458955	1976052	-482107
FUEL, COST & EMISSION SAVING	0	0		0	0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS			COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM	10**12 BTU	COAL	DISTILLATE	
TOTAL -- ALL	14654	-425	6082	0	0	509
FUEL SAVINGS CASES ONLY	1713	-17	1287	0	0	695
COST SAVINGS CASES ONLY	13094	-425	5463	0	0	486
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	33
FUEL & COST SAVINGS CASES	1617	-17	1259	0	0	643
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS			COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM	10**12 BTU	COAL	DISTILLATE	
TOTAL -- ALL	14654	-425	6082	0	0	509
FUEL SAVINGS CASES ONLY	1713	-17	1287	0	0	695
COST SAVINGS CASES ONLY	13094	-425	5463	0	0	486
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	33
FUEL & COST SAVINGS CASES	1617	-17	1259	0	0	643
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS			COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM	10**12 BTU	COAL	DISTILLATE	
TOTAL -- ALL	14654	-425	6082	0	0	509
FUEL SAVINGS CASES ONLY	1713	-17	1287	0	0	695
COST SAVINGS CASES ONLY	13094	-425	5463	0	0	486
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	33
FUEL & COST SAVINGS CASES	1617	-17	1259	0	0	643
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL																
INDUSTRY	NO. 3 CURRENT TECHNOLOGY	FUEL ENERGY SAVINGS			TOTAL UTILITY			PETROLEUM DIST. COST			SAVINGS DOLLARS \$000		*** STRATEGY OPTIMUM			ECS SIZE (MM)
		RATIO	SAVINGS	FUEL	SAVINGS	UTILITY	COST	RATIO	SAVINGS	CAPITAL COST \$000	EMISSIONS SAVINGS	PLANT UTILITY	TONS PER YEAR	----- TOTAL		
NO. 01 MEAT PACKING		0.363	59.5	106.9	-0.317	-123514	-123514	1064254	-0.519	-191067	114364	-76703	1.57			
NO. 02 BAKING		0.193	12.6	40.9	-0.631	-90065	-90065	286587	-0.733	-80179	43808	-36371	0.35*			
NO. 03 MALT BEVERAGE		0.222	49.7	172.0	-1.474	-389320	-389320	1019438	-0.719	-339116	183974	-155142	1.60			
NO. 04 WOVEN FABRIC MILL		0.236	39.1	131.7	-0.543	-215331	-215331	889763	-0.747	-259238	140960	-118278	1.51			
NO. 05 SAW MILL		0.255	20.6	91.7	-0.185	-94569	-94569	1559535	-0.723	-178536	98163	-80373	0.20*			
NO. 06 NEWSPRINT MILL		0.059	7.1	13.3	-0.001	-608	-608	108937	-0.094	-23605	13967	-9638	1.57			
NO. 07 WRITING PAPER MILL		0.126	14.0	32.6	-0.033	-15933	-15933	300877	-0.273	-71877	40956	-30921	1.57			
NO. 08 CORRUGATED PAPER		0.044	22.4	46.1	-0.013	-24503	-24503	689460	-0.093	-87063	49002	-38061	1.60			
NO. 09 BOX BOARD		0.060	9.3	19.1	-0.012	-6802	-6802	234647	-0.118	-35376	20246	-15129	1.58			
NO. 10 CHLORINE		0.104	69.3	111.0	0.008	1910	1910	788427	-0.122	-199395	120241	-79155	1.58			
NO. 11 ALUMINA		-0.014	-1.6	20.5	-0.110	-48641	-48641	162578	-0.278	-45503	21944	-23560	1.58			
NO. 12 LOW DENS. POLYETHYL		0.137	23.9	82.2	-0.120	-76655	-76655	430922	-0.422	-161886	87950	-73936	1.60			
NO. 13 HI DENS. POLYETHYL		0.210	16.9	53.0	-0.217	-60885	-60885	345440	-0.684	-114410	62139	-52271	1.59			
NO. 14 POLYVINYL CHLORIDE		0.212	32.2	110.5	-0.372	-157486	-157486	654622	-0.689	-217509	118141	-99368	1.59			
NO. 15 STYRENE-BUT. RUB.		0.150	7.8	26.4	-0.819	-59229	-59229	174516	-0.635	-52240	28351	-23889	1.59			
NO. 16 NYLON		0.240	11.5	39.8	-0.609	-64764	-64764	227063	-0.747	-78476	42681	-35795	1.49			
NO. 17 STYRENE		0.038	7.7	22.0	-0.117	-79361	-79361	248820	-0.179	-44372	23481	-20891	1.59			
NO. 18 ETHYLENE		0.039	47.6	57.5	-0.038	-153856	-153856	920080	-0.082	-121307	59035	-62272	1.59			
NO. 19 PETROLEUM REFINING		0.023	90.0	110.5	-0.037	-540906	-540906	3675610	-0.069	-304327	118309	-186018	1.58			
NO. 20 TILES		0.183	25.8	87.4	-0.340	-137826	-137826	650054	-0.617	-172183	93549	-78633	1.59			
NO. 23 INTEGRATED STEEL		0.001	2.9	53.0	-0.006	-60178	-60178	2805678	-0.008	-101832	62049	-39782	1.58			
NO. 24 GRAY IRON FOUNDRY		0.147	22.8	48.1	-0.042	-23491	-23491	295333	-0.304	-90911	51408	-39503	1.59			
NO. 25 COPPER		0.197	46.2	157.7	-0.444	-261121	-261121	962255	-0.656	-311290	168902	-142487	1.59			
NO. 26 MOTOR VEHICLE		0.137	29.2	93.0	-0.193	-148416	-148416	818856	-0.559	-193509	104907	-86602	1.60			

TOTAL -- ALL			650	1742		-2811431	-2811431	19343712		-3475199	1868420	-1606779				
FUEL SAVINGS CASES ONLY			651	1721		-2762790	-2762790	19181136		-342696	1846476	-1583220				
COST SAVINGS CASES ONLY			69	111		19180	19180	788427		-199395	120241	-79155				
EMISSIONS SAVINGS CASE ONLY			0	0		0	0	0		0	0	0				
FUEL & COST SAVINGS CASES			69	111		19180	19180	788427		-199395	120241	-79155				
FUEL, COST & EMISSION SAVING			0	0		0	0	0		0	0	0				

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUPPLY

YEAR : 1990
NO. 3 CURRENT

TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.

*** STRATEGY OPTIMUM

CATEGORY	TOTAL		UTILITY		COST SAVINGS		CAPITAL		EMISSIONS SAVINGS	
	FUEL	SAVINGS	FUEL	SAVINGS	DOLLARS	\$000	COST	\$000	PLANT	UTILITY
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU					TONS PER YEAR	TOTAL
TOTAL -- ALL	2195	5553			-8241730		56949776		-11161704	6013626
FUEL SAVINGS CASES ONLY	2211	5341			-7737753		55252280		-10690239	5786266
COST SAVINGS CASES ONLY	156	250			43151		1773785		-448595	276515
EMISSIONS SAVINGS CASE ONLY	0	0			0		0		0	0
FUEL & COST SAVINGS CASES	156	250			43151		1773785		-448595	276515
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
NATURAL PETROLEUM	PETROLEUM	GAS	DISTILLATE	BOILER	FUEL	COAL	FUEL
GAS	DISTILLATE	BOILER	FUEL				

SITE PLUS UTILITY							
TOTAL -- ALL	14654	-5620	-13375	0	0	4336	2195
FUEL SAVINGS CASES ONLY	14231	-5021	-13322	0	0	4126	2211
COST SAVINGS CASES ONLY	104	-229	-200	0	0	480	156
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	104	-229	-200	0	0	480	156
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION							
TOTAL -- ALL	14654	-5620	-13375	0	0	4336	2195
FUEL SAVINGS CASES ONLY	14231	-5021	-13322	0	0	4126	2211
COST SAVINGS CASES ONLY	104	-229	-200	0	0	480	156
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	104	-229	-200	0	0	480	156
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL														
INDUSTRY	NO. 4 CURRENT TECHNOLOGY	FUEL ENERGY TOTAL			PETROLEUM BOILER GRADE			STRATEGY OPTIMUM			EMISSIONS SAVINGS			ECS SIZE (MM)
		SAVINGS	FUEL	SAVINGS	UTILITY	COST	SAVINGS	CAPITAL COST \$000	SAVINGS \$000	RATIO	PLANT	UTILITY	TOTAL	
NO.01 HEAT PACKING		0.357	71.3	142.9	-0.355	-138076		2401531	-0.548	-254911	152862	-102049	12.66	
NO.02 BAKING		0.201	15.5	52.7	-0.600	-114194		960519	-0.724	-101414	56362	-45052	0.454	
NO.03 MILK BEVERAGE		0.217	50.6	180.6	-0.964	-253633		1755870	-0.696	-349552	193163	-156369	10.08	
NO.04 WOMEN FABRIC MILL		0.131	14.1	77.8	-0.209	-82733		1221693	-0.722	-155820	83275	-72545	1.934	
NO.05 SAW MILL		0.285	32.0	91.7	-0.222	-113729		3021426	-0.670	-172607	99163	-74444	0.204	
NO.06 NEWSPRINT MILL		0.253	30.3	91.4	0.026	11442		871105	-0.713	-177702	96292	-81410	24.37	
NO.07 WRITING PAPER MILL		0.247	80.1	272.5	-0.683	-334126		2713097	-0.715	-615654	342749	-272905	26.56	
NO.08 CORRUGATED PAPER		0.238	263.0	804.8	-0.366	-686498		6771519	-0.636	-1521006	856162	-664843	28.48	
NO.09 BOX BOARD		0.252	104.9	333.1	-0.547	-314347		2769907	-0.683	-629803	353256	-276547	28.11	
NO.10 CHLORINE		0.234	156.6	493.1	0.014	35347		4680342	-0.659	-968228	540818	-427409	22.57	
NO.11 ALUMINA		0.065	9.1	60.0	-0.154	-68228		535468	-0.498	-121277	64239	-57038	28.15	
NO.12 LOW DENS. POLYETHYL		0.141	24.6	148.6	-0.116	-74073		1417530	-0.798	-298899	159056	-139843	18.33	
NO.13 HI DENS. POLYETHYL		0.136	10.4	53.7	-0.095	-26561		568989	-0.693	-107378	57565	-49813	9.36	
NO.14 POLYVINYL CHLORIDE		0.141	16.2	73.7	-0.082	-34821		636341	-0.639	-145937	78782	-67055	6.704	
NO.15 STYRENE-BUT. RUB.		0.187	7.9	27.5	-0.543	-39535		296907	-0.617	-53319	29453	-23866	9.94	
NO.16 NYLON		0.157	4.5	20.7	-0.089	-4999		233760	-0.685	-40938	22168	-18770	3.884	
NO.17 STYRENE		0.065	14.7	49.0	-0.142	-96692		535103	-0.294	-93896	51306	-42590	20.92	
NO.18 ETHYLENE		0.059	72.3	99.3	-0.022	-88134		1346050	-0.101	-183304	102014	-81290	15.12	
NO.19 PETROLEUM REFINING		0.163	1060.4	2709.9	-0.193	-2921105		25931728	-0.420	-5125734	2900718	-2225016	28.11	
NO.20 TILES		0.149	16.5	57.4	-0.060	-24299		770267	-0.522	-111168	61394	-49774	6.264	
NO.23 INTEGRATED STEEL		0.018	83.5	497.4	-0.021	-227657		7422055	-0.080	-909025	521814	-387210	28.53	
NO.24 GRAY IRON FOUNDRY		0.159	24.6	74.2	-0.017	-9725		796134	-0.490	-143051	79390	-63660	17.35	
NO.25 COPPER		0.149	23.9	82.6	-0.050	-29204		1039128	-0.528	-160761	88446	-72315	5.564	
NO.26 MOTOR VEHICLE		0.128	26.6	93.9	-0.105	-79935		1365959	-0.532	-182482	100465	-82017	10.14	

TOTAL -- ALL			2214	6524		-5720256		70235104		-12623757	7089908	-5533843		
FUEL SAVINGS CASES ONLY			2214	6524		-5720256		70235104		-12623757	7089908	-5533843		
COST SAVINGS CASES ONLY			197	591		46789		5551446		-1145929	637110	-508819		
EMISSIONS SAVINGS CASE ONLY			0	0		0		0		0	0	0		
FUEL & COST SAVINGS CASES			197	591		46789		5551446		-1145929	637110	-508819		
FUEL,COST & EMISSION SAVINGS			0	0		0		0		0	0	0		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -									
NATIONAL SUMMARY									
YEAR : 1980		TECHNOLOGY, DIESEL, LOW SPEED, PETROLEUM BOILER GRADE				*** STRATEGY OPTIMUM			
NO. 4 CURRENT		TOTAL FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
CATEGORY		10**12 BTU		DOLLARS \$000		\$000		TONS PER YEAR	
		10**12 BTU		10**12 BTU		UTILITY		PLANT UTILITY TOTAL	
TOTAL -- ALL		7210	22064	-19066528	226112832	-43569856	24300016	-19269904	
FUEL SAVINGS CASES ONLY		7210	22064	-19066528	226112832	-43569856	24300016	-19269904	
COST SAVINGS CASES ONLY		903	2462	249536	23473472	-4818763	2647517	-2171244	
EMISSIONS SAVINGS CASE ONLY		0	0	0	0	0	0	0	
FUEL & COST SAVINGS CASES		803	2462	249536	23473472	-4818763	2647517	-2171244	
FUEL, COST & EMISSION SAVINGS		0	0	0	0	0	0	0	

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NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DEPRIVED		TOTAL FUEL
	NATURAL PETROLEUM GAS	PETROLEUM DISTILLATE	COAL	OTHER FUEL	

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	-30066	0	0	20850	2197	7210
FUEL SAVINGS CASES ONLY	14654	-425	-30066	0	0	20850	2197	7210
COST SAVINGS CASES ONLY	280	0	-2263	0	0	2786	0	803
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	280	0	-2263	0	0	2786	0	803
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	-30066	0	0	0	20850	2197	7210
FUEL SAVINGS CASES ONLY	14654	-425	-30066	0	0	0	20850	2197	7210
COST SAVINGS CASES ONLY	280	0	-2263	0	0	0	2786	0	803
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	280	0	-2263	0	0	0	2786	0	803
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CYAS GENERAL SUMMARY - PROCESS LEVEL									
INDUSTRY	NO. 5 CURRENT TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETROLEUM DIST			*** STRATEGY OPTIMUM			EMISSIONS SAVINGS		
	FUEL SAVINGS RATIO	FUEL SAVINGS	UTILITY FUEL SAVINGS RATIO	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR	01 ECS SIZE (MM)
NO. 01 MEAT PACKING	0.334	48.8	89.4	-0.078	-30459	0.658	-10627	95650	85023 7.69
NO. 02 BAKING	0.162	6.5	12.5	-0.133	-16942	0.533	-1329	13379	12050 0.11*
NO. 03 MALT BEVERAGE	0.310	44.6	91.7	-0.292	-77027	0.648	-14002	98133	84131 5.06
NO. 04 HOVEN FABRIC MILL	0.169	18.2	42.7	-0.036	-14225	0.384	-7092	45721	38629 0.96*
NO. 05 SAW MILL	0.169	18.9	8.4	-0.003	-1661	0.155	8237	9030	17267 0.01*
NO. 06 NEWSPRINT MILL	0.224	26.8	49.9	0.070	30619	0.408	-6037	52561	46544 35.55
NO. 07 WRITING PAPER MILL	0.340	49.0	91.9	0.018	8732	0.660	-13520	115615	102095 26.42
NO. 08 CORRUGATED PAPER	0.343	281.1	520.2	-0.060	-112406	0.660	-63184	553351	490167 72.55
NO. 09 ECK BOARD	0.342	77.4	144.1	-0.021	-12255	0.660	-17731	152791	135060 71.82
NO. 10 CHLORINE	0.307	205.3	353.7	0.132	327637	0.554	-43383	383239	339856 29.89
NO. 11 ALUMINA	0.215	36.7	91.4	-0.161	-71295	0.528	-14555	97612	78257 42.27
NO. 12 LOW DENS. POLYETHYL	0.134	23.3	47.7	0.027	17427	0.249	-7320	51024	43704 5.48
NO. 13 HI DENS. POLYETHYL	0.270	20.6	44.1	0.049	13831	0.554	-7399	47196	39797 7.16
NO. 14 POLYVINYL CHLORIDE	0.309	37.6	60.3	0.035	14991	0.647	-13462	85917	72454 6.82
NO. 15 STYRENE-EMUL. RUB.	0.290	10.3	20.7	-0.230	-16651	0.603	-3223	22196	16973 7.37
NO. 16 NITRO	0.216	6.2	13.2	0.020	2146	0.447	-1927	14180	12253 2.44
NO. 17 STYRENE	0.121	27.7	48.9	-0.169	-114409	0.382	3337	52342	55579 20.76
NO. 18 ETHYLENE	0.050	62.1	94.8	-0.073	-297333	0.124	1852	97378	99231 15.21
NO. 19 PETROLEUM REFINING	0.303	1979.6	2733.7	-0.054	-801473	0.549	-5959	2931474	2925515 84.56
NO. 20 TIRES	0.322	44.2	83.6	-0.004	-1484	0.646	-9322	89494	79672 8.96
NO. 23 INTEGRATED STEEL	0.045	203.9	437.4	0.032	344442	0.081	-128330	521814	393484 98.23
NO. 24 GRAY IRON FOUNDRY	0.152	23.5	38.2	0.034	18794	0.288	-3541	40890	37343 7.54
NO. 25 COPPER	0.320	63.2	120.2	-0.002	-1256	0.643	-14697	128628	113931 7.14
NO. 26 MOTOR VEHICLE	0.204	70.5	133.2	-0.035	-26748	0.645	-15997	142677	126660 12.84
TOTAL -- ALL		3336	5447		-819884		-394710	5842501	5447791
FUEL SAVINGS CASES ONLY		3336	5447		-819884		-394710	5842501	5447791
COST SAVINGS CASES ONLY		586	1206		778319		-224920	1312454	1087534
EMISSIONS SAVINGS CASE ONLY		109	152		-413403		13426	158751	172177
FUEL & COST SAVINGS CASES		576	1206		778319		-224920	1312454	1087534
FUEL, COST & EMISSIONS SAVINGS		0	0		0		0	0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO. 5 CURRENT TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETROLEUM DIST *** STRATEGY OPTIMUM 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	9318	15843	-3537063	65562976	-1451574	17161296	15709739
FUEL SAVINGS CASES ONLY	9318	15843	-3537063	65562976	-1451574	17161296	15709739
COST SAVINGS CASES ONLY	2449	4806	2254818	19725520	-786918	5397987	4611073
EMISSIONS SAVINGS CASE ONLY	592	868	-2599055	11447728	41224	919986	961210
FUEL & COST SAVINGS CASES	2449	4806	2254818	19725520	-786918	5397987	4611073
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL		
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	COAL	OTHER	FUEL
TOTAL -- ALL	14654	-18125	-4036	0	14628	2197	9318
FUEL SAVINGS CASES ONLY	14654	-18125	-4036	0	14628	2197	9318
COST SAVINGS CASES ONLY	2274	-4447	1134	0	2714	775	2449
EMISSIONS SAVINGS CASE ONLY	6982	-2191	-5187	0	944	44	592
FUEL & COST SAVINGS CASES	2274	-4447	1134	0	2714	775	2449
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-18125	-4036	0	14628	2197	9318
FUEL SAVINGS CASES ONLY	14654	-18125	-4036	0	14628	2197	9318
COST SAVINGS CASES ONLY	2274	-4447	1134	0	2714	775	2449
EMISSIONS SAVINGS CASE ONLY	6982	-2191	-5187	0	944	44	592
FUEL & COST SAVINGS CASES	2274	-4447	1134	0	2714	775	2449
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-18125	-4036	0	14628	2197	9318
FUEL SAVINGS CASES ONLY	14654	-18125	-4036	0	14628	2197	9318
COST SAVINGS CASES ONLY	2274	-4447	1134	0	2714	775	2449
EMISSIONS SAVINGS CASE ONLY	6982	-2191	-5187	0	944	44	592
FUEL & COST SAVINGS CASES	2274	-4447	1134	0	2714	775	2449
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY OPTIMUM				EMISSIONS SAVINGS		01	
NO. 6 CURRENT TECHNOLOGY, COMB. CYCLE, DIP. FIRED, PETROLEUM DIST.										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		----- TONS PER YEAR -----		ECS SIZE (MM)	
INDUSTRY	FUEL SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000					PLANT UTILITY	SAVINGS RATIO	----- TONS PER YEAR -----	TOTAL				
NO. 01 MEAT PACKING	0.267	90.5	282.0	-1.254	-487948	2211045	0.657	-81526	301653	220126	25.15						
NO. 02 BAKING	0.213	15.3	49.7	-1.368	-195398	1446664	0.656	-14463	53214	38752	0.43*						
NO. 03 MALT BEVERAGE	0.235	54.7	180.7	-1.130	-297663	971820	0.617	-54464	193282	138918	10.07						
NO. 04 KOVEN FABRIC MILL	0.253	49.1	164.4	-0.619	-245522	1486349	0.653	-49783	175946	126163	3.76*						
NO. 05 SAW MILL	0.293	32.9	91.7	-0.678	-346945	4670155	0.664	-24337	98163	73826	0.20*						
NO. 06 NEWSPRINT MILL	0.269	49.1	153.8	-0.221	-96333	490578	0.657	-43757	161905	118148	11.13						
NO. 07 WRITING PAPER MILL	0.267	90.5	286.2	-0.847	-414462	1155159	0.657	-97949	359981	262032	83.51						
NO. 08 CORRUGATED PAPER	0.269	516.2	1616.9	-1.128	-2118597	5102087	0.657	-465647	1720037	1254391	137.35						
NO. 09 BOX BOARD	0.269	141.9	445.7	-0.977	-561593	1435225	0.657	-128193	472668	344475	112.78						
NO. 10 CHLORINE	0.266	275.8	793.9	-0.172	-427160	2829143	0.662	-219316	860238	640922	68.02						
NO. 11 ALUMINA	0.214	77.8	284.0	-0.967	-427739	891234	0.602	-90818	304090	213271	133.58						
NO. 12 LOW DENS. POLYETHYL	0.259	45.1	148.6	-0.065	-41577	717006	0.653	-44515	159056	114541	18.32						
NO. 13 HI DENS. POLYETHYL	0.256	40.8	136.7	-0.550	-154406	583605	0.653	-41521	146478	104957	22.53						
NO. 14 POLYVINYL CHLORIDE	0.256	74.5	250.2	-0.756	-319714	1032841	0.653	-75846	267550	191704	21.53						
NO. 15 STYRENE-OUT. RUB.	0.223	11.9	38.9	-0.690	-64313	215000	0.597	-11602	41736	29935	14.05						
NO. 16 MILK	0.259	14.7	48.6	-0.540	-57601	267052	0.654	-14610	52123	37513	9.10*						
NO. 17 STYRENE	0.057	13.1	47.7	-0.176	-119125	340180	0.233	-17410	51023	33613	20.81						
NO. 18 ETHYLENE	0.022	28.0	90.2	-0.078	-314922	1265836	0.064	-42267	92656	50390	15.20						
NO. 19 PETROLEUM REFINING	0.237	1540.1	2704.2	-0.122	-1804829	11350818	0.472	-394936	2894593	2499653	112.68						
NO. 20 TIRES	0.256	96.5	323.5	-1.176	-476402	1474928	0.653	-97980	346196	248217	35.25						
NO. 23 INTEGRATED STEEL	0.030	135.0	437.4	-0.003	-31685	4344411	0.074	-160735	521814	361079	99.46						
NO. 24 GRAY IRON FOUNDRY	0.227	35.2	74.2	0.019	10619	414931	0.492	-15501	79390	63889	17.30						
NO. 25 COPPER	0.256	139.8	468.5	-1.134	-666503	1876731	0.653	-142438	501349	358911	28.28						
NO. 26 MOTOR VEHICLE	0.244	153.5	514.5	-1.045	-791675	2442335	0.653	-156204	550909	394705	50.39						
TOTAL -- ALL										49074996		-2496007	10406045	7920029			
FUEL SAVINGS CASES ONLY										49074996		-2496007	10406045	7920029			
COST SAVINGS CASES ONLY										10319		-15501	79390	63889			
EMISSIONS SAVINGS CASE ONLY										0		0	0	0			
FUEL & COST SAVINGS CASES										10319		-15501	79390	63889			
FUEL, COST & EMISSIONS SAVING										0		0	0	0			

YEAR : 1990
 NO. 6 CURRENT TECHNOLOGY, COIRB. CYCLE, DIR. FIRED, PETROLEUM DIST. NATIONAL SUMMARY
 *** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS ----- TONS PER YEAR ----- PLANT UTILITY TOTAL
TOTAL -- ALL	11878	33909	-40162480	154349056	-9575305 36985536 27410320
FUEL SAVINGS CASES ONLY	11878	33909	-40162480	154349056	-9575305 36985536 27410320
COST SAVINGS CASES ONLY	68	142	20738	795152	-29713 152176 122463
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0 0 0
FUEL & COST SAVINGS CASES	68	142	20738	795152	-29713 152176 122463
FUEL, COST & EMISSION SAVING	0	0	0	0	0 0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM DISTILLATE FUEL	PETROLEUM BOILER FUEL	COAL DISTILLATE BOILER FUEL	COAL FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14654	-29816	-7851	0	32694	2197	11878
FUEL SAVINGS CASES ONLY	14654	-29816	-7851	0	32694	2197	11878
COST SAVINGS CASES ONLY	71	-124	-101	0	144	78	68
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	71	-124	-101	0	144	78	68
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-29816	-7851	0	32694	2197	11878
FUEL SAVINGS CASES ONLY	14654	-29816	-7851	0	32694	2197	11878
COST SAVINGS CASES ONLY	71	-124	-101	0	144	78	68
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	71	-124	-101	0	144	78	68
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-29816	-7851	0	32694	2197	11878
FUEL SAVINGS CASES ONLY	14654	-29816	-7851	0	32694	2197	11878
COST SAVINGS CASES ONLY	71	-124	-101	0	144	78	68
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	71	-124	-101	0	144	78	68
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL													
NO. 7 ADVANCED TECHNOLOGY STEAM TURBINE 615 PSIA(EXT), COAL DER. B.G.													
INDUSTRY	FUEL ENERGY TOTAL		UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS		EMISSIONS SAVINGS		ECS SIZE (FZ)
	SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS	PLANT UTILITY	TONS PER YEAR	PLANT UTILITY	TONS PER YEAR	
NO. 01 MEAT PACKING	0.143	15.0	29.6	-0.034	-13157	643999	0.225	-11653	31613	19960	2.82		
NO. 02 BAKING	0.057	2.3	4.5	-0.169	-24173	196922	0.132	-1772	4941	3069	0.04*		
NO. 03 MALT BEVERAGE	0.173	13.7	27.2	-0.032	-8451	441217	0.268	-10567	29096	18529	1.62		
NO. 04 WOVEN FABRIC MILL	0.017	1.8	5.5	-0.047	-16507	247154	0.027	-3128	5889	2761	0.14*		
NO. 05 SAW MILL	0.161	18.1	4.0	0.074	37310	1138206	0.125	9743	4324	14067	0.01*		
NO. 06 NEWSRINT MILL	0.059	7.0	20.6	0.024	10551	157042	0.100	-10010	21641	11631	15.63		
NO. 07 WITTING PAPER MILL	0.132	14.7	29.7	0.073	35647	319034	0.202	-13563	37340	23777	9.10		
NO. 08 CORRUGATED PAPER	0.216	112.0	217.9	0.145	271990	1222528	0.341	-81001	231820	150819	48.37		
NO. 09 BOX BOARD	0.198	30.6	60.4	0.135	77703	371083	0.308	-22635	64017	41383	31.89		
NO. 10 CHLORINE	0.078	52.3	36.2	0.056	139306	515281	0.071	8053	39210	47263	3.27		
NO. 11 ALUMINA	-0.039	-4.3	11.1	-0.070	-30802	159191	-0.003	-12149	11913	-236	5.61		
NO. 12 LOW DENS. POLYETHYL	0.010	1.7	5.2	-0.014	-8740	151071	0.014	-3053	5579	2527	0.67		
NO. 13 HI DENS. POLYETHYL	0.021	1.8	5.6	-0.024	-6854	126695	0.036	-3345	6024	2679	1.03		
NO. 14 POLYVINYL CHLORIDE	0.026	3.0	10.3	-0.030	-12799	235463	0.045	-6082	10983	4901	0.98		
NO. 15 STYRENE-BUT. RUB.	0.072	1.4	2.4	-0.017	-1250	53030	0.103	-1127	2628	1501	0.94		
NO. 16 NYLON	0.017	0.5	1.4	-0.030	-3139	53305	0.026	-800	1541	741	0.30*		
NO. 17 STYRENE	0.094	21.2	45.0	-0.071	-48038	361299	0.166	-19730	48099	28369	20.77		
NO. 18 ETHYLENE	0.035	42.2	57.1	-0.017	-70238	835879	0.032	-31743	58686	26944	9.55		
NO. 19 PETROLEUM REFINING	0.036	149.0	167.7	0.001	16653	2658750	0.034	-98319	200917	102598	13.06		
NO. 20 TILES	0.036	4.0	12.1	-0.036	-14681	310464	0.064	-6762	12957	6195	1.45		
NO. 23 INTEGRATED STEEL	0.002	7.8	39.1	0.001	12954	2957460	0.006	-15013	41865	26853	7.21		
NO. 24 GRAY IRON FOUNDRY	0.009	1.3	2.6	-0.021	-11939	81114	-0.001	-2840	2759	-81	0.59*		
NO. 25 COPPER	0.035	5.6	17.2	-0.035	-20545	391431	0.057	-10242	18399	8147	1.15		
NO. 26 MOTOR VEHICLE	0.031	6.5	19.5	-0.070	-52800	477208	0.061	-11168	20863	9715	2.11		
TOTAL - ALL		509	952		256543	14114839		-358903	913014	554111			
FUEL SAVINGS CASES ONLY		513	941		287345	13955045		-346754	901102	554347			
COST SAVINGS CASES ONLY		332	536		602614	9339333		-222743	641134	418391			
EMISSIONS SAVINGS CASE ONLY		70	40		177117	1653435		17796	43533	61330			
FUEL & COST SAVINGS CASES		332	596		602614	9339333		-222743	641134	418391			
FULL-COST & EMISSIONS SAVING		70	40		177117	1653435		17796	43533	61330			

YEAR : 1990
 NO. 7 ADVANCED TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL DER. B.G. *** STRATEGY OPTIMUM
 NATIONAL SUMMARY

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10*12 BTU	10*12 BTU	10*12 BTU	10*12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	1838	3456			1073900	45267536			-1568255	3751165
FUEL SAVINGS CASES ONLY	1838	3456			1393036	43618128			-1442381	3627734
COST SAVINGS CASES ONLY	1359	2409			2558282	27693312			-954266	2647352
EMISSIONS SAVINGS CASE ONLY	152	89			335883	3340990			36794	96501
FUEL & COST SAVINGS CASES	1759	2409			2558282	27693312			-954266	2647352
FUEL, COST & EMISSION SAVING	152	89			335883	3340990			36794	96501

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10*12 BTU		COAL DERIVED		BOILER FUEL		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	DISTILLATE	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14054	-425			0		-22912	2242	2197	1838
FUEL SAVINGS CASES ONLY	14231	-17			0		-22341	2126	2197	1883
COST SAVINGS CASES ONLY	6508	0			0		-11491	916	1974	1359
EMISSIONS SAVINGS CASE ONLY	119	0			0		-359	323	13	152
FUEL & COST SAVINGS CASES	6508	0			0		-11491	916	1974	1359
FUEL, COST & EMISSION SAVING	119	0			0		-359	323	13	152
INCLUDING COAL FUEL CONVERSION										
TOTAL -- ALL	0	0			0		0	-1473	2197	724
FUEL SAVINGS CASES ONLY	0	0			0		0	-1360	2197	837
COST SAVINGS CASES ONLY	0	0			0		0	-1271	1974	702
EMISSIONS SAVINGS CASE ONLY	0	0			0		0	61	13	74
FUEL & COST SAVINGS CASES	0	0			0		0	-1271	1974	702
FUEL, COST & EMISSION SAVING	0	0			0		0	61	13	74

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO. 8 ADVANCED TECHNOLOGY STEAM TURBINE (615 PSIA EXT), COAL (AFB)												
INDUSTRY	FUEL ENERGY		UTILITY		COST SAVINGS		*** STRATEGY OPTIMUM		EMISSIONS SAVINGS		ECS SIZE (MM)	
	SAVINGS RATIO	TOTAL FUEL	SAVINGS FUEL	RATIO	DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT TONS PER YEAR	UTILITY TOTAL			
NO. 01 MEAT PACKING	0.093	10.3	26.5	0.006	2411	1226424	0.153	-14714	28311	13597	2.64	
NO. 02 BAKING	0.039	1.5	4.3	-0.149	-21223	297098	0.091	-2519	4637	2117	0.04*	
NO. 03 MALT BEVERAGE	0.119	9.1	24.2	0.096	25162	839837	0.201	-13587	25912	12325	1.51	
NO. 04 WOVEN FABRIC MILL	0.000	0.0	2.4	0.013	5204	356617	-0.002	-2720	2565	-155	0.07*	
NO. 05 SAW MILL	0.156	17.5	4.4	-0.204	-104562	2486733	0.121	8823	4757	13579	0.01*	
NO. 06 NEWSPRINT MILL	0.051	6.1	13.2	0.113	49123	215522	0.066	-6303	13942	7640	10.36	
NO. 07 WRITING PAPER MILL	0.151	16.8	18.2	0.162	79157	676650	0.162	-3759	22866	19107	6.49	
NO. 08 CORRUGATED PAPER	0.220	111.2	117.3	0.289	542957	2224150	0.249	-17907	124764	106858	29.31	
NO. 09 BOX BOARD	0.259	40.1	36.6	0.273	157015	750273	0.281	-1049	38809	37760	21.96	
NO. 10 CHLORINE	0.066	43.8	18.2	0.118	293251	779689	0.051	13727	19692	33419	1.68	
NO. 11 ALUMINA	-0.057	-6.3	4.8	0.079	34755	181734	-0.048	-9338	5107	-4231	2.26	
NO. 12 LOW DENS. POLYETHYL	-0.001	-0.2	4.6	0.011	6830	330126	0.000	-4890	4936	46	0.67	
NO. 13 HI DENS. POLYETHYL	0.003	0.3	1.9	0.077	21751	152559	0.003	-1788	2036	247	0.34*	
NO. 14 POLYVINYL CHLORIDE	0.009	1.0	2.6	0.102	42963	250641	0.006	-2209	2629	620	0.24*	
NO. 15 STYRENE-BUT. RUB.	0.046	0.9	2.1	0.136	9332	106699	0.059	-1376	2235	859	0.83	
NO. 16 NYLON	0.010	0.3	0.7	0.075	8016	62070	0.010	-509	799	290	0.15*	
NO. 17 STYRENE	0.079	17.8	43.9	0.235	159509	618294	0.151	-24109	46947	22838	20.93	
NO. 18 ETHYLENE	0.009	9.8	16.2	0.380	1541897	1231640	-0.013	-26912	16628	-10284	2.63	
NO. 19 PETROLEUM REFINING	0.005	21.7	148.2	0.346	5101699	5607202	-0.009	-185280	158643	-26638	11.05	
NO. 20 TIRES	0.014	1.5	4.0	0.132	53511	369315	0.013	-2967	4280	1312	0.47*	
NO. 23 INTEGRATED STEEL	-0.001	-5.8	36.9	-0.009	-93674	3525345	0.003	-24085	39464	15379	7.42	
NO. 24 GRAY IRON FOUNDRY	-0.011	-1.7	2.5	0.171	95238	188728	-0.018	-5150	2715	-2435	0.57*	
NO. 25 COPPER	0.012	2.0	5.8	0.133	78106	480748	0.008	-5126	6257	1131	0.38*	
NO. 26 MOTOR VEHICLE	0.010	2.1	6.7	0.073	55625	559662	0.010	-5569	7128	1559	0.70	
TOTAL -- ALL					8144527	23518112		-339316	536257	246940		
FUEL SAVINGS CASES ONLY					8101379	19292192		-295854	534035	233131		
COST SAVINGS CASES ONLY					8364005	17208960		-321535	537400	215864		
EMISSIONS SAVINGS CASE ONLY					193668	3266422		22550	24449	46939		
FUEL & COST SAVINGS CASES					8227184	16503383		-302157	524642	222484		
FUEL, COST & EMISSIONS SAVING					293251	779689		13727	19692	33419		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1950
NO. 8 ADVANCED TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT.), COAL (AFB) *** STRATEGY OPTIMUM 07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	1250	2030			28130580	75381216			-1114912	2210569
FUEL SAVINGS CASES ONLY	1331	1832			27733580	64731232			-937714	2052167
COST SAVINGS CASES ONLY	1224	1942			28551584	63287720			-1080826	2116919
EMISSIONS SAVINGS CASE ONLY	132	49			459284	6520722			47795	53420
FUEL & COST SAVINGS CASES	1294	1865			27974832	59395168			-949796	2034163
FUEL, COST & EMISSION SAVING	99	41			659749	1754127			30883	44303

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE FUEL	GAS	COAL	OTHER	FUEL
TOTAL -- ALL	14654	-425	6082	0	0	-21258	2197	1250
FUEL SAVINGS CASES ONLY	12827	-17	5055	0	0	-17819	1455	1331
COST SAVINGS CASES ONLY	13173	-425	5495	0	0	-16539	1520	1224
EMISSIONS SAVINGS CASE ONLY	119	0	55	0	0	-56	13	132
FUEL & COST SAVINGS CASES	12612	-17	5072	0	0	-17801	1429	1294
FUEL, COST & EMISSION SAVING	104	0	47	0	0	-53	0	99

CIAS GENERAL SUMMARY - PROCESS LEVEL													
NO. 9 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL DER. DIST.													
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		COAL DER. DIST.		SAVINGS		EMISSIONS		SAVINGS		01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	COST \$000	DOLLARS \$000	COST \$000	SAVINGS RATIO	PLANT	UTILITY	TOTAL	
NO. 01 MEAT PACKING	0.439	109.7	193.7	-0.627	-243937	1926085	0.263	-142748	207149	64401	11.43		
NO. 02 EATING	0.323	19.0	33.7	-0.223	-32500	217686	0.264	-24835	36051	11216	0.29*		
NO. 03 MEAT LEVERAGE	0.440	103.2	182.3	-0.700	-184334	972945	0.264	-134181	154998	60808	10.08		
NO. 04 WOVEN FABRIC MILL	0.436	56.6	99.9	-0.028	-11299	625944	0.265	-73450	106920	33470	2.26		
NO. 05 SAW MILL	0.423	47.5	91.7	-0.007	-3563	1495446	0.245	-70607	98163	27556	0.20*		
NO. 06 NEWSPRINT MILL	0.444	59.6	105.7	0.025	10935	569305	0.265	-76600	111332	34733	13.78		
NO. 07 WRITING PAPER MILL	0.444	109.2	193.8	-0.331	-161948	1251716	0.265	-167734	243760	76026	14.02		
NO. 08 CORRUGATED PAPER	0.327	237.2	424.5	-0.112	-210358	2566193	0.206	-315433	451534	136151	14.90		
NO. 09 BOX BOARD	0.332	99.4	177.8	-0.132	-104473	1030431	0.234	-130923	183516	57593	14.87		
NO. 10 CHLORINE	0.476	318.4	499.1	0.108	269200	2964160	0.296	-345357	540318	195462	14.88		
NO. 11 ALUMINA	0.359	91.5	175.9	-0.416	-184268	931043	0.220	-135305	168323	53018	14.91		
NO. 12 LOW DENS. POLYETHYL	0.397	69.2	148.6	-0.022	-14335	830318	0.220	-120069	159056	38997	12.09		
NO. 13 HI DENS. POLIETHYL	0.445	47.0	83.0	-0.061	-17251	440906	0.265	-61187	88954	27767	13.57		
NO. 14 POLYVINYL CHLORIDE	0.445	85.9	151.5	-0.158	-66720	603110	0.265	-111393	162008	50615	12.93		
NO. 15 STYRENE-EUT. RUB.	0.415	22.5	39.4	-0.576	-41674	232747	0.252	-29090	42277	13187	14.12		
NO. 16 HDPE	0.445	17.0	30.1	-0.039	-4164	160460	0.266	-22114	32238	10124	5.53		
NO. 17 STYRENE	0.110	25.1	48.3	-0.142	-96341	378024	0.078	-39529	51639	12109	13.94		
NO. 18 ETHYLENE	0.043	54.0	90.6	-0.025	-262111	1321219	0.004	-89383	93092	3709	10.10		
NO. 19 PETROLEUM REFINING	0.192	1000.9	1424.4	-0.080	-1186718	10790651	0.128	-988196	1524699	536493	14.95		
NO. 20 TIRES	0.445	110.7	195.1	-0.395	-159809	1229128	0.266	-143266	205768	65503	14.05		
NO. 23 INTEGRATED STEEL	0.057	260.4	480.4	0.024	26892	4893660	0.049	-275007	514303	239296	14.14		
NO. 24 GRAY IRON FOUNDRY	0.335	51.9	74.2	0.073	40528	476099	0.222	-49280	79390	30111	11.47		
NO. 25 COPPER	0.445	160.3	282.7	-0.351	-206292	1500045	0.264	-208311	302527	94217	11.28		
NO. 26 MOTOR VEHICLE	0.414	176.0	310.1	-0.391	-256134	2134145	0.265	-228204	332059	103955	12.05		

TOTAL -- ALL		3332	5537		-2907173	39645663		-3902194	5958593	1976401			
FUEL SAVINGS CASES ONLY		3332	5537		-2907173	39645663		-3902194	5958593	1976401			
COST SAVINGS CASES ONLY		690	1159		581555	6903723		-746243	1245943	499501			
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0			
FUEL & COST SAVINGS CASES		690	1159		581555	6903723		-746243	1245943	499501			
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0			

YEAR : 1990
NO. 9 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL DER. DIST.
- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

07

*** STRATEGY OPTIMUM

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS ----- PLANT UTILITY TOTAL
TOTAL -- ALL	11267	19427	-11763962	131758752	-14661525 21274096 6632560
FUEL SAVINGS CASES ONLY	11267	19427	-11763962	131758752	-14661525 21274096 6632560
COST SAVINGS CASES ONLY	2201	3757	1345982	25203248	-2536764 4009001 1472239
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0 0 0
FUEL & COST SAVINGS CASES	2201	3757	1345982	25203248	-2536764 4009001 1472239
FUEL, COST & EMISSIONS SAVING	0	0	0	0	0 0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS SAVINGS 10**12 BTU	PETROLEUM SAVINGS 10**12 BTU	COAL SAVINGS 10**12 BTU	TOTAL SAVINGS 10**12 BTU
TOTAL -- ALL	14654	425	0	15079
FUEL SAVINGS CASES ONLY	14654	425	0	15079
COST SAVINGS CASES ONLY	1616	0	0	1616
EMISSIONS SAVINGS CASE ONLY	0	0	0	0
FUEL & COST SAVINGS CASES	1616	0	0	1616
FUEL, COST & EMISSIONS SAVING	0	0	0	0

SITE PLUS UTILITY

CATEGORY	NATURAL GAS SAVINGS 10**12 BTU	PETROLEUM SAVINGS 10**12 BTU	COAL SAVINGS 10**12 BTU	TOTAL SAVINGS 10**12 BTU
TOTAL -- ALL	14654	425	0	15079
FUEL SAVINGS CASES ONLY	14654	425	0	15079
COST SAVINGS CASES ONLY	1616	0	0	1616
EMISSIONS SAVINGS CASE ONLY	0	0	0	0
FUEL & COST SAVINGS CASES	1616	0	0	1616
FUEL, COST & EMISSIONS SAVING	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	NATURAL GAS SAVINGS 10**12 BTU	PETROLEUM SAVINGS 10**12 BTU	COAL SAVINGS 10**12 BTU	TOTAL SAVINGS 10**12 BTU
TOTAL -- ALL	0	0	0	0
FUEL SAVINGS CASES ONLY	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0
FUEL, COST & EMISSIONS SAVING	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL										
NO.10 ADVANCED TECHNOLOGY DIESEL, LOW SPEED, COAL DERIVED BOILER GRD										
INDUSTRY	FUEL ENERGY TOTAL		FUEL UTILITY		COST SAVINGS		DOLLARS \$000		*** STRATEGY OPTIMUM	
	SAVINGS RATIO	SAVINGS TOTAL	SAVINGS TOTAL	SAVINGS TOTAL	RATIO	RATIO	SAVINGS \$000	SAVINGS \$000	EMISSIONS TONS PER YEAR	SAVINGS TOTAL

NO.01 MEAT PACKING	0.375	77.0	148.4	-0.380	-143033	-0.489	2619874	-254546	158700	-95847 13.15
NO.02 BAKING	0.244	15.1	37.9	-0.406	-69359	-0.593	740687	-68463	40570	-27693 0.32*
NO.03 MALT BEVERAGE	0.295	68.6	180.6	-0.732	-192779	-0.594	1609125	-328853	193190	-135663 10.05
NO.04 WOVEN FABRIC MILL	0.209	21.6	77.8	-0.250	-98968	-0.509	1661352	-176465	83275	-93190 2.40*
NO.05 SAW MILL	0.315	35.4	91.7	-0.206	-105373	-0.600	3065711	-165768	98163	-67605 0.20*
NO.06 NEWSPRINT MILL	0.328	39.4	91.4	0.106	46000	-0.593	853584	-164073	96292	-67781 28.60
NO.07 WRITING PAPER MILL	0.321	86.0	217.2	-0.319	-156090	-0.590	2267121	-460042	273220	-166822 25.29
NO.08 CORRUGATED PAPER	0.311	344.4	607.7	-0.222	-416754	-0.535	7004742	-1431453	859222	-572231 28.48
NO.09 BOX BOARD	0.331	133.3	320.1	-0.332	-190793	-0.574	2776376	-567473	339462	-228011 26.91
NO.10 CHLORINE	0.300	200.4	499.1	0.053	131419	-0.681	5359193	-991074	540819	-450255 24.90
NO.11 ALUMINA	0.162	61.5	301.7	-1.091	-432624	-0.707	2689016	-589917	323057	-265860 25.91
NO.12 LOW DENS. POLYETHYL	0.210	36.7	143.6	-0.057	-36315	-0.714	1401600	-285524	159056	-126467 18.32
NO.13 HI DENS. POLYETHYL	0.196	85.0	410.3	-2.251	-632226	-0.732	3567739	-800234	439513	-360721 27.16
NO.14 POLYVINYL CHLORIDE	0.155	149.8	721.6	-2.723	-1151250	-0.791	6416990	-1404936	771734	-633202 24.96
NO.15 STYRENE-UT. RUB.	0.241	9.4	24.2	-0.372	-26890	-0.507	291015	-44142	25918	-18224 8.71
NO.16 NYLON	0.214	6.2	20.7	-0.041	-4352	-0.601	243719	-39002	22168	-16834 3.88*
NO.17 STYRENE	0.085	19.6	48.1	-0.119	-80744	-0.240	551835	-86845	51475	-37370 20.92
NO.18 ETHYLENE	0.059	74.7	99.3	-0.021	-84351	-0.034	1395629	-176540	102008	-74532 15.12
NO.19 PETROLEUM REFINING	0.194	1260.9	2719.9	-0.156	-2306007	-0.351	26941792	-4869877	2911338	-1959539 28.14
NO.20 TIRES	0.196	116.4	540.8	-2.336	-946095	-0.766	5820113	-1050609	578690	-471919 23.67
NO.23 INTEGRATED STEEL	0.027	123.7	487.4	-0.011	-120937	-0.063	7930640	-827945	521814	-306130 24.94
NO.24 GRAY IRON FOUNDRY	0.178	27.6	74.2	-0.004	-2070	-0.430	629429	-137649	79390	-58259 17.30
NO.25 COPPER	0.196	171.3	602.0	-2.156	-1267555	-0.763	7222635	-1559129	858254	-700875 24.31
NO.26 MOTOR VEHICLE	0.190	195.0	909.6	-2.245	-1760715	-0.769	10518308	-1769799	974292	-795507 25.58

TOTAL -- ALL		3350	9781		-10043423		103965126	-18251344	10501611	-7749730
FUEL SAVINGS CASES ONLY		3350	9781		-10043423		103965126	-18251344	10501611	-7749730
FUEL SAVINGS CASES ONLY		240	591		177419		6212777	-1155146	637110	-518036
EMISSIONS SAVINGS CASE ONLY		0	0		0		0	0	0	0
FUEL & COST SAVINGS CASES		240	591		177419		6212777	-1155146	637110	-518036
FUEL,COST & EMISSION SAVING		0	0		0		0	0	0	0

YEAR : 1990
 10.10 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL DERIVED BOILER GRD
 NATIONAL SUMMARY

07

*** STRATEGY OPTIMUM

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR		
	10**12 BTU	10**12 BTU				PLANT	UTILITY	TOTAL

TOTAL -- ALL	11054	32793	-31724208	332866304	-62102864	35629504	-26473424	
FUEL SAVINGS CASES ONLY	11054	32793	-31724208	332866304	-62102864	35629504	-26473424	
COST SAVINGS CASES ONLY	1036	2482	979175	24740400	-4667651	2647519	-2020134	
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	
FUEL & COST SAVINGS CASES	1036	2482	979175	24740400	-4667651	2647519	-2020134	
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS	TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE						

SITE PLUS UTILITY	14654	-425	6082	0	-43032	31578	2197	11054
TOTAL -- ALL	14654	-425	6082	0	-43032	31578	2197	11054
FUEL SAVINGS CASES ONLY	280	0	223	0	-2253	2786	0	1036
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	280	0	223	0	-2253	2786	0	1036
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION	0	0	0	0	0	-881	2197	1316
TOTAL -- ALL	0	0	0	0	0	-881	2197	1316
FUEL SAVINGS CASES ONLY	0	0	0	0	0	286	0	286
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	286	0	286
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INDUSTRY	CIS GENERAL SUMMARY - PROCESS LEVEL				NO. 11 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL/FULVIERIZED				*** STRATEGY OPTIMUM				EMISSIONS SAVINGS				O1 ECS SIZE (MM)
	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FULL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	PLANT UTILITY	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	
NO. 01 MEAT PACKING	0.366	72.8	141.8	0.026	10160			2653365	-0.551	-255835	151711	-104123	12.55				
NO. 02 BEARING	0.208	16.4	54.8	-0.491	-70245			1247913	-0.754	-107001	58651	-49150	0.47*				
NO. 03 MALT BEVERAGE	0.222	51.8	120.6	-0.162	-47336			2144161	-0.718	-357197	193171	-164026	10.07				
NO. 04 WOOLEN FABRIC MILL	0.180	84.5	440.6	-0.750	-297438			5951560	-0.675	-900850	471520	-429329	10.10				
NO. 05 SAW MILL	0.245	33.1	91.7	-0.097	-34103			3477824	-0.688	-175660	99163	-77497	0.20*				
NO. 06 REUSPRINT MILL	0.247	32.1	91.4	0.312	136201			1015481	-0.789	-187881	96292	-91589	25.62				
NO. 07 WRITING PAPER MILL	0.256	64.2	315.3	0.117	57339			3521832	-0.752	-727680	396558	-331122	26.31				
NO. 08 CORRUGATED PAPER	0.243	268.3	604.8	0.167	312018			7592941	-0.653	-1552440	656196	-695244	28.46				
NO. 09 FOLK EMBROID	0.258	107.1	333.1	0.171	93277			3100187	-0.705	-642980	353268	-289713	28.09				
NO. 10 CHLORINE	0.272	131.8	439.1	0.293	739115			5421266	-0.670	-933903	540919	-443084	22.89				
NO. 11 ALUMINA	0.149	57.0	304.6	-0.266	-117903			2893447	-0.786	-624136	326152	-297964	26.13				
NO. 12 LOW DENS. POLYETHYL	0.196	34.2	143.6	0.212	135155			1656150	-0.755	-299956	159056	-140900	18.30				
NO. 13 HI DENS. POLYETHYL	0.182	13.9	53.7	0.165	46266			684123	-0.682	-107679	57565	-50114	9.34				
NO. 14 POLYVINYL CHLORIDE	0.182	20.9	73.7	0.147	62227			1019312	-0.624	-146132	78782	-67351	6.68*				
NO. 15 STYRENE-ETH. RUB.	0.211	11.3	33.9	-0.121	-11671			479826	-0.683	-77087	41710	-35377	14.06				
NO. 16 NYLON	0.203	5.9	20.7	0.120	17103			292137	-0.673	-41010	22168	-19843	3.83*				
NO. 17 STYRENE	0.205	15.1	40.0	-0.059	-39705			614669	-0.283	-96076	51309	-44767	20.90				
NO. 18 ETHYLENE	0.258	73.2	160.4	0.007	26332			1543794	-0.096	-183322	103090	-85233	15.26				
NO. 19 PETROLEUM REFINING	0.165	174.5	2793.2	0.031	450016			29031648	-0.417	-5222841	2898820	-2324021	28.07				
NO. 20 TILES	0.182	26.3	91.2	0.058	23520			1316864	-0.613	-180525	97580	-82946	9.95				
NO. 23 INTEGRATED STEEL	0.225	115.7	487.4	0.036	385929			7986064	-0.071	-867266	521814	-345452	28.47				
NO. 24 GRAY IRON FOUNDRY	0.167	25.8	74.2	0.142	79456			941046	-0.488	-145529	79390	-66139	17.33				
NO. 25 COPPER	0.182	38.7	135.2	0.088	51709			1722416	-0.624	-268555	144037	-123918	8.17				
NO. 26 MOTOR VEHICLE	0.176	179.9	509.9	-0.814	-616649			11277465	-0.555	-1658367	974357	-864010	25.55				
TOTAL -- ALL		2635	8149		1401352			9703923		-16015705	8772772	-7242921					
FUEL SAVINGS CASES ONLY			8149		1401352			9703923		-16015705	8772772	-7242921					
COST SAVINGS CASES ONLY			6079		2636717			69721616		-11818532	6557740	-5260704					
EMISSIONS SAVINGS CASE ONLY			0		0			0		0	0	0					
FUEL & COST SAVINGS CASES		2135	6079		2636717			69721616		-11818532	6557740	-5260704					
FUEL, COST & EMISSIONS SAVING		0	0		0			0		0	0	0					

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 11 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL (PULVERIZED)

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	FUEL	SAVINGS	FUEL	SAVINGS	DOLLARS	\$000	COST	\$000	PLANT	UTILITY	SAVINGS	TOTAL
--- ALL	8727	27737	27737		6164291		317694720		-56138960	30492368	-25646800	
FUEL SAVINGS CASES ONLY	8727	27737	27737		6164291		317694720		-56138960	30492368	-25646800	
COST SAVINGS CASES ONLY	7327	21006	21006		9626474		237007136		-42440320	23286176	-19154192	
EMISSIONS SAVINGS CASE ONLY	0	0	0		0		0		0	0	0	
FUEL & COST SAVINGS CASES	7327	21006	21006		9626474		237007136		-42440320	23286176	-19154192	
FUEL, COST & EMISSION SAVING	0	0	0		0		0		0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	OTHER	FUEL
---	14654	-425	6082	0	-16144	2364
---	14654	-425	6082	0	-16144	2364
---	13745	0	5445	0	-15306	1351
---	0	0	0	0	0	0
---	13745	0	5445	0	-15306	1351
---	0	0	0	0	0	0
---	1465	0	579	0	0	5396
---	1465	0	579	0	0	5396
---	1466	0	574	0	0	3983
---	0	0	0	0	0	0
---	1466	0	574	0	0	3983
---	0	0	0	0	0	0

SITE PLUS UTILITY

--- ALL	14654	-425	6082	0	-16144	2364	2197	8727
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-16144	2364	2197	8727
COST SAVINGS CASES ONLY	13745	0	5445	0	-15306	1351	2091	7327
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	13745	0	5445	0	-15306	1351	2091	7327
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

--- ALL	1465	0	579	0	0	5396	2197	9637
FUEL SAVINGS CASES ONLY	1465	0	579	0	0	5396	2197	9637
COST SAVINGS CASES ONLY	1466	0	574	0	0	3983	2091	8118
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	1466	0	574	0	0	3983	2091	8118
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY OPTIMUM				EMISSIONS SAVINGS		ECS	
NO.12 ADVANCED TECHNOLOGY GAS TURBINE DIRECT FIRED PETR. BOILER GRD										CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	TOTAL	TOTAL	TOTAL	TOTAL
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS RATIO	COST DOLLARS \$000	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000								
NO.01 HEAT PACKING	0.365	56.7	98.1	0.146	56630					540460	0.552	-28536	104988	76452	8.68		
NO.02 BAYING	0.186	7.4	13.2	-0.027	-3806					154182	0.448	-3992	14136	10144	0.11*		
NO.03 MALT BEVERAGE	0.368	53.4	92.6	0.120	31600					329025	0.553	-26823	99060	72237	5.11		
NO.04 WOVEN FABRIC MILL	0.202	21.8	42.7	0.105	41518					278444	0.312	-14327	45717	31390	0.96*		
NO.05 SAW MILL	0.175	19.6	8.4	0.063	32131					1235238	0.143	6822	9029	15651	0.01*		
NO.06 NEWSPRINT MILL	0.269	32.3	91.4	0.172	74922					213281	0.504	-38708	96292	57534	68.75		
NO.07 PULPING PAPER MILL	0.373	56.3	98.6	0.243	118762					337662	0.553	-33770	124062	90292	28.42		
NO.08 CORRUGATED PAPER	0.373	322.8	564.4	0.210	393603					1414990	0.553	-163858	600406	436546	78.94		
NO.09 BOX BOARD	0.372	88.6	155.6	0.226	130011					409413	0.552	-45261	164991	119730	77.78		
NO.10 CHLORINE	0.354	236.5	499.1	0.254	630487					1154803	0.558	-178728	540819	362090	44.64		
NO.11 ALUMINA	0.258	43.6	89.6	0.075	33156					217390	0.442	-31320	95887	64567	41.50		
NO.12 LOW DENS. POLYETHYL	0.175	30.6	148.6	0.058	37120					361172	0.462	-77959	159056	81097	18.17		
NO.13 HI DENS. POLYETHYL	0.323	24.7	53.7	0.219	61435					157032	0.520	-19613	57565	37952	9.23		
NO.14 POLYVINYL CHLORIDE	0.370	42.6	73.7	0.268	113227					250420	0.548	-21341	78782	57440	6.59		
NO.15 STYRENE-BUT. RUB.	0.341	12.0	20.6	0.104	7426					71126	0.513	-6012	22097	16085	7.35		
NO.16 NYLON	0.279	6.1	20.7	0.165	17629					71089	0.501	-8435	22168	13733	3.84		
NO.17 STYRENE	0.108	29.3	49.0	-0.024	-16442					219536	0.251	-15803	52391	36588	20.88		
NO.18 ETHYLENE	0.051	63.5	93.3	-0.024	-97426					1004062	0.071	-39311	95801	56491	15.18		
NO.19 PETROLEUM 7	0.317	2076.2	2748.9	0.145	2138542					8994074	0.452	-528535	2942394	2413859	84.49		
NO.20 TILES	0.376	57.5	99.5	0.226	91735					334015	0.554	-28657	106433	77777	10.70		
NO.23 INTEGRATED STEEL	0.053	241.4	487.4	0.065	694427					3507262	0.076	-154291	521814	367524	98.42		
NO.24 GRAY IRON FOUNDRY	0.213	33.0	74.2	0.125	69529					227519	0.308	-28949	79390	50441	17.23		
NO.25 COPPER	0.376	83.1	143.7	0.231	135626					429951	0.553	-41926	153756	111830	8.57		
NO.26 MOTOR VEHICLE	0.335	91.2	157.7	0.158	119653					554501	0.553	-45754	168897	123143	15.26		
TOTAL -- ALL		3732	5925		4911560					22466683		-1575084	6355425	4780833			
FUEL SAVINGS CASES ONLY		3732	5925		4911560					22466683		-1575084	6355425	4780833			
COST SAVINGS CASES ONLY		3632	5669		5029235					2103012		-1515978	6193597	4677617			
EMISSIONS SAVINGS CASE ONLY		20	8		32131					1235238		6822	9029	15651			
FUEL & COST SAVINGS CASES		3632	5769		5029235					2103012		-1515978	6193597	4677617			
FUEL, COST & EMISSION SAVINGS		20	8		32131					1235238		6822	9029	15651			

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.12 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETR. BOILER GRD

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
					----- TONS PER YEAR -----		
TOTAL -- ALL	10403	17861	13718579	64989072	-5378184	19332784	13954583
FUEL SAVINGS CASES ONLY	10403	17361	13718579	64989072	-5378184	19332784	13954583
COST SAVINGS CASES ONLY	9317	16975	14502177	56516128	-5024937	18414464	13389516
EMISSIONS SAVINGS CASE ONLY	38	16	61588	2367717	13077	17306	30383
FUEL & COST SAVINGS CASES	9817	16975	14502177	56516128	-5024937	18414464	13389516
FUEL, COST & EMISSION SAVING	39	16	61588	2367717	13077	17306	30383

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DEPIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM FUEL	BOILER FUEL	GAS	DISTILLATE FUEL	
	14654	-425	-22669	0	0	0	16646
	14654	-425	-22669	0	0	0	16646
	7687	-425	-15305	0	0	0	15708
	15	0	-10	0	0	0	19
	7687	-425	-15305	0	0	0	15708
	15	0	-10	0	0	0	19
	14654	-425	-22669	0	0	0	16646
	14654	-425	-22669	0	0	0	16646
	7687	-425	-15305	0	0	0	15708
	15	0	-10	0	0	0	19
	7687	-425	-15305	0	0	0	15708
	15	0	-10	0	0	0	19

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	-22669	0	0	0	16646	2197	10403
FUEL SAVINGS CASES ONLY	14654	-425	-22669	0	0	0	16646	2197	10403
COST SAVINGS CASES ONLY	7687	-425	-15305	0	0	0	15708	2153	9817
EMISSIONS SAVINGS CASE ONLY	15	0	-10	0	0	0	19	13	38
FUEL & COST SAVINGS CASES	7687	-425	-15305	0	0	0	15708	2153	9817
FUEL, COST & EMISSION SAVING	15	0	-10	0	0	0	19	13	38

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	-22669	0	0	0	16646	2197	10403
FUEL SAVINGS CASES ONLY	14654	-425	-22669	0	0	0	16646	2197	10403
COST SAVINGS CASES ONLY	7687	-425	-15305	0	0	0	15708	2153	9817
EMISSIONS SAVINGS CASE ONLY	15	0	-10	0	0	0	19	13	38
FUEL & COST SAVINGS CASES	7687	-425	-15305	0	0	0	15708	2153	9817
FUEL, COST & EMISSION SAVING	15	0	-10	0	0	0	19	13	38

CTAS GENERAL SUMMARY - PROCESS LEVEL															
NO.13 ADVANCED TECHNOLOGY GAS TURBINE/DIRECT FIRED COAL DER.BUR CTD															
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST SAVINGS		RATIO		DOLLARS \$000		RATIO		SAVINGS \$000		EMISSIONS SAVINGS		ECS SIZE (MM)
	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	PLANT	TONS PER YEAR	TOTAL		
*** STRATEGY OPTIMUM															
NO.01 MEAT PACKING	0.365	56.7	99.1	0.147	57366	0.521	533596	0.521	-30866	104989	74121	8.68			
NO.02 BAKING	0.166	7.4	13.2	-0.026	-3763	0.422	153753	0.422	-4301	14136	9835	0.11*			
NO.03 MALT BEVERAGE	0.368	53.4	92.6	0.121	31951	0.521	325555	0.521	-29011	99060	70049	5.11			
NO.04 LOVEN FABRIC MILL	0.202	21.8	42.7	0.105	41652	0.295	277115	0.295	-15491	45717	30226	0.96*			
NO.05 SAW MILL	0.175	19.6	8.4	0.063	32160	0.148	1234950	0.148	7694	9829	16722	0.01*			
NO.06 NEWSPRINT MILL	0.269	32.3	91.4	0.173	75407	0.465	208487	0.465	-42282	96292	54010	68.75			
NO.07 WRITING PAPER MILL	0.373	56.3	98.6	0.243	119198	0.522	333341	0.522	-36536	124062	87526	28.42			
NO.08 CORRUGATED PAPER	0.373	322.8	564.4	0.211	396470	0.522	1326598	0.522	-177294	600406	423112	78.94			
NO.09 ECK BOARD	0.372	89.6	155.6	0.227	130799	0.521	401612	0.521	-48980	164991	116011	77.78			
NO.10 CHLORINE	0.354	236.5	499.1	0.255	632500	0.523	1134832	0.523	-194848	540818	345970	44.64			
NO.11 ALUMINA	0.258	43.6	89.6	0.076	33493	0.415	214060	0.415	-34057	95887	61831	41.50			
NO.12 LOW DENS. POLYETHYL	0.175	30.6	148.6	0.059	37714	0.415	355287	0.415	-85452	159056	73604	18.17			
NO.13 HI DENS. POLIETHYL	0.323	24.7	53.7	0.220	61649	0.493	154914	0.493	-21346	57565	36219	9.23			
NO.14 POLYVINYL CHLORIDE	0.370	42.6	73.7	0.268	113519	0.516	247589	0.516	-23086	78782	55696	6.59			
NO.15 STYRENE-BUT. RUB.	0.341	12.0	20.6	0.105	7582	0.495	70273	0.495	-6504	22097	15593	7.35			
NO.16 NYLON	0.279	8.1	20.7	0.166	17707	0.463	70314	0.463	-9193	22168	12974	3.84			
NO.17 STYRENE	0.128	29.3	49.0	-0.024	-16259	0.229	217728	0.229	-16570	52391	35822	20.88			
NO.18 ETHYLENE	0.051	63.5	93.3	-0.024	-97040	0.062	1000257	0.062	-41604	95801	54197	15.18			
NO.19 PETROLEUM REFINING	0.332	2104.3	2749.4	0.153	2260004	0.430	8921209	0.430	-527210	2941844	2414634	84.45			
NO.20 TIRES	0.376	57.5	99.5	0.228	92180	0.523	329608	0.523	-30994	106433	75440	10.70			
NO.23 INTEGRATED STEEL	0.053	241.4	487.4	0.065	697551	0.072	3476328	0.072	-169501	521814	352213	98.42			
NO.24 GRAY IRON FOUNDRY	0.213	33.0	74.2	0.125	69863	0.353	224220	0.353	-31548	79390	47842	17.23			
NO.25 COPPER	0.376	63.1	143.7	0.232	136167	0.522	424569	0.522	-45361	153756	108395	8.57			
NO.26 MOTOR VEHICLE	0.335	91.2	157.7	0.159	120426	0.522	542853	0.522	-49494	168897	119403	15.26			

TOTAL - ALL		376.0	592.4		5049049		22143072		-1663932	6355375	4691440				
FUEL SAVINGS CASES ONLY		376.0	592.4		5049049		22143072		-1663932	6355375	4691440				
COST SAVINGS CASES ONLY		376.0	576.9		516113		20771344		-1601457	6193048	4591587				
EMISSIONS SAVINGS CASE ONLY		20	8		32160		1234950		7694	9029	16722				
FUEL & COST SAVINGS CASES		376.0	576.9		516113		20771344		-1601457	6193048	4591587				
FUEL,COST & EMISSION SAVING		376.0	592.4		32160		1234950		7694	9029	16722				

YEAR : 1990
 NO. 13 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL DER. BLR GPD
 NATIONAL SUMMARY

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU			COST SAVINGS DOLLARS \$000		CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR		
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU		PLANT	UTILITY	TOTAL
ALL	10457	17860	14011730	64075008	14011730	64075008	-5746862	19331728	13594857
FUEL SAVINGS CASES ONLY	10457	17860	14011730	64075008	14011730	64075008	-5746862	19331728	13594857
COST SAVINGS CASES ONLY	9371	16974	14791805	55637483	14791805	55637483	-5373403	18413405	13039996
EMISSIONS SAVINGS CASE ONLY	33	16	61644	2367165	61644	2367165	14747	17306	32053
FUEL & COST SAVINGS CASES	9971	16974	14791805	55637483	14791805	55637483	-5373403	18413405	13039996
FUEL, COST & EMISSION SAVING	39	16	61644	2367165	61644	2367165	14747	17306	32053

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU			COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM BOILER FUEL	PETROLEUM BOILER FUEL	GAS	COAL	
ALL	14654	-425	6092	0	0	10457
FUEL SAVINGS CASES ONLY	14654	-425	6092	0	0	10457
COST SAVINGS CASES ONLY	7637	-425	4076	0	0	9971
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	39
FUEL & COST SAVINGS CASES	7637	-425	4076	0	0	9971
FUEL, COST & EMISSION SAVING	15	0	8	0	0	39

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU			COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM BOILER FUEL	PETROLEUM BOILER FUEL	GAS	COAL	
ALL	14654	-425	6092	0	0	10457
FUEL SAVINGS CASES ONLY	14654	-425	6092	0	0	10457
COST SAVINGS CASES ONLY	7637	-425	4076	0	0	9971
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	39
FUEL & COST SAVINGS CASES	7637	-425	4076	0	0	9971
FUEL, COST & EMISSION SAVING	15	0	8	0	0	39

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO.14 ADVANCED TECHNOLOGY GAS TURBINE DIRECT FIRED COAL GASIFIER									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST SAVINGS		CAPITAL COST \$000		EMISSIONS RATIO		ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	DOLLARS \$000	\$000	SAVINGS RATIO	PLANT UTILITY	EMISSIONS SAVINGS PER YEAR	
NO.01 MEAT PACKING	0.209	21.9	43.7	0.026	33392	1473776	0.379	-13067	33635 3.93*
NO.02 BAKING	0.099	4.0	7.9	-0.097	-13890	340277	0.263	-2326	6131 0.07*
NO.03 MALT BEVERAGE	0.226	21.6	43.1	0.193	50721	915170	0.411	-12655	33396 2.36*
NO.04 WOMEN FABRIC MILL	0.104	11.1	22.0	0.030	12032	735758	0.167	-6416	17146 0.49*
NO.05 SAW MILL	0.136	15.3	8.4	0.010	4978	1556649	0.127	5274	14307 0.01*
NO.06 NEWSPRINT MILL	0.224	26.8	40.4	0.238	103571	492024	0.298	-7849	34640 28.40
NO.07 LITTING PAPER MILL	0.327	36.4	59.1	0.374	183060	994414	0.499	-15474	74301 58327 17.63
NO.08 CORRUGATED PAPER	0.231	139.8	266.2	0.364	663676	3240791	0.412	-79630	283163 203533 55.03
NO.09 FOX BOARD	0.237	36.7	72.5	0.350	207190	961079	0.416	-20970	76864 55994 37.54
NO.10 CHLORINE	0.144	56.6	121.0	0.120	446540	1316571	0.181	-11352	131117 119756 10.09
NO.11 ALUMINA	0.106	13.0	42.1	0.168	74401	551859	0.271	-18428	45065 26637 19.15
NO.12 LOW DENS. POLYETHYL	0.062	10.8	23.3	0.074	47264	456673	0.098	-7591	24936 17396 2.65*
NO.13 HI DENS. POLYETHYL	0.121	9.2	19.2	0.145	40670	347795	0.192	-5394	19506 14112 2.92*
NO.14 POLYVINYL CHLORIDE	0.149	17.2	33.9	0.178	75168	652227	0.244	-10020	36288 26267 2.84*
NO.15 STYRENE-OUT. FUB.	0.205	5.0	9.6	0.173	12522	194139	0.366	-2878	10350 7472 3.39*
NO.16 NYLON	0.125	3.6	7.2	0.123	13161	167565	0.200	-2065	7676 5610 1.30*
NO.17 STYRENE	0.093	21.8	48.4	0.040	27454	725659	0.219	-17605	51804 34199 20.76
NO.18 ETHYLENE	0.052	65.1	92.7	0.017	66979	2153392	0.073	-31185	95253 64069 15.19
NO.19 PETROLIUM PLEINING	0.266	1733.9	2742.6	0.365	5378244	34270368	0.424	-556005	2935679 2376674 84.09
NO.20 TIRES	0.215	23.5	46.5	0.248	100400	942037	0.372	-13495	49734 36239 4.93*
NO.21 REINFORCED STEEL	0.018	81.1	179.7	0.020	214308	4568065	0.027	-58984	192346 133362 28.61
NO.24 GRAY IRON FOUNDRY	0.062	12.7	26.4	0.093	51805	469716	0.138	-9474	28219 18745 5.21
NO.25 COPPER	0.210	33.7	67.9	0.225	155950	1209143	0.364	-20833	72687 51854 4.00*
NO.26 MOTOR VEHICLE	0.170	35.4	77.1	0.162	122577	1555961	0.357	-25303	82565 57263 7.36
TOTAL -- ALL		2472	4169		8092214	6030112		-943623	439392 3450268
FUEL SAVINGS CASES ONLY		2472	4169		8092214	6030112		-943623	439392 3450268
EMISSIONS SAVINGS CASES ONLY		2459	4092		8106105	60490340		-941297	4395435 3444137
FUEL & COST SAVINGS CASES		2490	4092		9106105	60499840		-941297	4385435 3444137
FUEL, COST & EMISSIONS SAVINGS		15	8		4978	1556649		5274	9033 14307

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

HJ.14 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL GASIFIER

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
					--- TONS PER YEAR ---		
TOTAL -- ALL	6596	11149	22935424	168625552	-2773641	12050230	9276578
FUEL SAVINGS CASES ONLY	6596	11149	22935424	168625552	-2773641	12050230	9276578
COST SAVINGS CASES ONLY	6539	11133	22920493	167973312	-2769181	12034019	9264826
EMISSIONS SAVINGS CASE ONLY	29	16	9542	2983901	10108	17315	27423
FUEL & COST SAVINGS CASES	6589	11133	22962048	167973312	-2769181	12034019	9264826
FUEL, COST & EMISSION SAVING	29	16	9542	2983901	10108	17315	27423

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL PETROLEUM	PETROLEUM	GAS	DISTILLATE	BOILER	FUEL	COAL	FUEL

SITE PLUS UTILITY

TOTAL -- ALL	14054	-425	6082	0	0	-8184	-7728	2197	6596
FUEL SAVINGS CASES ONLY	14054	-425	6082	0	0	-8184	-7728	2197	6596
COST SAVINGS CASES ONLY	14054	-425	6077	0	0	-8184	-7718	2184	6589
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	0	-7	13	29
FUEL & COST SAVINGS CASES	14054	-425	6077	0	0	-8184	-7718	2184	6589
FUEL, COST & EMISSION SAVING	15	0	8	0	0	0	-7	13	29

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	1030	0	789	0	0	0	6926	2197	10993
FUEL SAVINGS CASES ONLY	1030	0	789	0	0	0	6926	2197	10993
COST SAVINGS CASES ONLY	1030	0	789	0	0	0	6929	2184	10983
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	26	13	39
FUEL & COST SAVINGS CASES	1030	0	789	0	0	0	6929	2184	10983
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	26	13	39

CTAS GENERAL SUMMARY - PROCESS LEVEL													*** STRATEGY OPTIMUM			EMISSIONS SAVINGS			01 ECS SIZE (MM)	
NO.15 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL(PFB)													CAPITAL COST \$000	SAVINGS DOLLARS \$000	SAVINGS RATIO	EMISSIONS RATIO	---- TONS PER YEAR ----			TOTAL
INDUSTRY	FUEL SAVINGS RATIO	ENERGY SAVINGS	TOTAL FUEL SAVINGS	UTILITY SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	EMISSIONS RATIO	PLANT UTILITY	UTILITY	SAVINGS RATIO	EMISSIONS RATIO					SAVINGS RATIO	EMISSIONS RATIO		
NO.01 MEAT PACKING	0.258	32.9	70.9	0.010	4066	1742089	0.435	-26558	75905	49247	6.30									
NO.02 BAKING	0.133	5.5	12.1	-0.112	-16006	400218	0.360	-4610	12999	8399	0.10*									
NO.03 MALT BEVERAGE	0.226	23.0	71.9	0.010	2672	1200125	0.413	-30512	76898	46386	3.99*									
NO.04 KOVEN FABRIC MILL	0.130	14.0	43.6	0.019	7725	1023490	0.254	-20629	46651	26022	0.99*									
NO.05 SAW MILL	0.166	18.7	8.8	-0.257	-131595	2803748	0.145	6924	9453	16387	0.01*									
NO.06 MERSPPRINT MILL	0.337	40.4	81.6	0.305	133082	716694	0.497	-28190	85909	57720	58.58									
NO.07 WRITING PAPER MILL	0.312	34.7	59.1	0.313	153120	927730	0.464	-19561	74301	54741	17.86									
NO.08 CORRUGATED PAPER	0.282	205.7	423.4	0.312	565302	3966098	0.453	-153679	455738	302059	90.14									
NO.09 BOX BOARD	0.284	56.8	117.6	0.314	120716	1139557	0.455	-41768	124702	82934	58.94									
NO.10 CHLORINE	0.227	151.7	253.0	0.230	571417	2840787	0.323	-93180	306641	213461	24.07									
NO.11 ALUMINA	0.132	21.3	82.9	0.069	30602	796605	0.320	-43322	88747	45425	38.64									
NO.12 LOW DENS. POLYETHYL	0.081	14.1	35.8	0.077	48906	536704	0.130	-15188	38288	23100	4.14*									
NO.13 HI DENS. POLIETHYL	0.154	11.7	39.2	0.157	44191	516463	0.310	-19234	41995	22762	6.42									
NO.14 POLYVINYL CHLORIDE	0.190	21.9	67.9	0.190	90131	921172	0.375	-32157	72579	40422	5.60									
NO.15 STYRENE-EXT. RUB.	0.211	6.6	16.3	0.060	4361	236337	0.333	-6916	17437	10521	5.83									
NO.16 RUBCH	0.153	4.4	11.3	0.122	13047	198180	0.263	-4806	12173	7367	2.11*									
NO.17 STYRENE	0.084	21.4	43.3	0.211	143378	747658	0.201	-20312	51678	31366	20.89									
NO.18 ETHYLENE	0.039	48.3	98.3	0.352	1429106	2351367	0.055	-52479	100928	48448	15.12									
NO.19 PETROLEUM REFINING	0.301	1956.4	2712.6	0.372	5499693	30251056	0.424	-538173	2903596	2365424	84.20									
NO.20 TILES	0.215	23.5	55.8	0.179	72502	1084751	0.383	-22348	59693	37345	6.93									
NO.23 INTEGRATED STEEL	0.008	126.1	399.4	0.066	272936	6260221	0.050	-184197	427653	243456	64.87									
NO.24 GRAY IRON FOUNDRY	0.023	12.9	28.4	0.217	121151	461941	0.133	-12336	30408	18072	5.65									
NO.25 COPPER	0.213	34.1	69.8	0.214	125727	1229078	0.347	-25201	74646	49446	4.15*									
NO.26 MOTOR VEHICLE	0.195	40.9	93.8	0.128	97152	1722453	0.396	-37006	100465	63460	10.19									
TOTAL -- ALL													9462395	64073472	-1425432	5267387	3663955			
FUEL SAVINGS CASES ONLY													9462395	64073472	-1425432	5267387	3663955			
COST SAVINGS CASES ONLY													9462395	64073472	-1425432	5267387	3663955			
EMISSIONS SAVINGS CASE ONLY													9462395	64073472	-1425432	5267387	3663955			
FUEL & COST SAVINGS CASES													9462395	64073472	-1425432	5267387	3663955			
FUEL,COST & EMISSIONS SAVING													9462395	64073472	-1425432	5267387	3663955			

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.15 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL(PFB)

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
					----- TONS PER YEAR -----		
TOTAL -- ALL	7871	14393	32564000	184305264	-4729543	15515892	10786333
FUEL SAVINGS CASES ONLY	7871	14393	32564000	184305264	-4729543	15515892	10786333
COST SAVINGS CASES ONLY	7824	14359	32846890	178163872	-4733979	15472836	10736942
EMISSIONS SAVINGS CASE ONLY	35	17	-250243	5374053	13272	18139	31411
FUEL & COST SAVINGS CASES	7824	14353	32846880	178163872	-4733979	15472836	10735842
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL
	NATURAL PETROLEUM GAS	DISTILLATE FUEL	PETROLEUM BOILER FUEL	GAS BOILER FUEL	DISTILLATE FUEL	COAL FUEL	

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	-14637	2197	7871
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	-14637	2197	7871
COST SAVINGS CASES ONLY	14639	-425	6059	0	0	-14630	2171	7824
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	-1	13	36
FUEL & COST SAVINGS CASES	14639	-425	6059	0	0	-14630	2171	7824
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FULL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	-14637	2197	7871
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	-14637	2197	7871
COST SAVINGS CASES ONLY	14639	-425	6059	0	0	-14630	2171	7824
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	-1	13	36
FUEL & COST SAVINGS CASES	14639	-425	6059	0	0	-14630	2171	7824
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY OPTIMUM			EMISSIONS SAVINGS			01	
NO.16 ADVANCED TECHNOLOGY,GAS TURBINE,INDIRECT FIRED,COAL(AFB)										CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		----- TCHS PER YEAR -----		ECS SIZE (MM)	
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		----- TCHS PER YEAR -----		ECS SIZE (MM)					
NO.01 MEAT PACKING	0.134	14.1	30.8	0.009	3615	1302256	0.201	-15147	32961	17814	2.91						
NO.02 BAKING	0.057	2.3	4.7	-0.125	-17825	276857	0.120	-2228	5012	2785	0.04*						
NO.03 MALT BEVERAGE	0.167	13.2	26.7	0.109	28925	845279	0.253	-12425	28600	16175	1.58*						
NO.04 KOVEN FABRIC MILL	0.065	7.0	14.3	0.012	4661	627679	0.084	-6634	15262	8627	0.34*						
NO.05 SAW MILL	0.094	10.6	8.1	-0.374	-191423	3221978	0.085	861	8676	9537	0.01*						
NO.06 NEWSPRINT MILL	0.194	23.2	32.7	0.174	75787	460766	0.226	-8195	34468	26273	24.62						
NO.07 WRITING PAPER MILL	0.443	49.3	59.1	0.376	184096	1026776	0.536	-11145	74301	63157	18.78						
NO.08 CORRUGATED PAPER	0.351	177.3	205.4	0.339	637162	3580171	0.429	-34273	218524	184250	48.09						
NO.09 BOX BOARD	0.390	60.4	72.5	0.368	211873	1093176	0.478	-12604	76864	64261	40.04						
NO.10 CHLORINE	0.134	89.5	94.7	0.147	384573	1729412	0.136	-12446	102603	90157	8.41						
NO.11 ALUMINA	0.074	8.2	29.8	0.129	57175	465914	0.155	-18303	31872	13569	14.39						
NO.12 LOW DENS. POLYETHYL	0.032	5.6	11.3	0.041	26049	347575	0.038	-5338	12059	6721	1.37*						
NO.13 HI DENS. POLYETHYL	0.076	5.8	11.4	0.093	26058	304952	0.095	-5234	12212	6978	1.96*						
NO.14 POLYVINYL CHLORIDE	0.082	10.6	20.8	0.110	46628	563502	0.117	-9552	22211	12660	1.86*						
NO.15 STYRENE-BUT. RUB.	0.156	3.3	6.2	0.134	9718	162598	0.228	-2812	6618	3806	2.32						
NO.16 NYLON	0.067	1.9	3.9	0.066	7072	131082	0.085	-1818	4193	2374	0.76*						
NO.17 STYRENE	0.101	22.8	45.4	0.207	140215	842504	0.177	-21537	48501	26964	20.76						
NO.18 ETHYLENE	0.064	80.1	90.6	0.351	1422421	2897760	0.065	-36883	93255	56372	15.17						
NO.19 PETROLEUM REFINING	0.229	1278.9	1705.6	0.323	4767948	27492544	0.299	-543443	1911561	1368119	78.32						
NO.20 TILES	0.151	16.5	31.3	0.152	61428	836326	0.205	-13517	33510	19993	3.55						
NO.23 INTEGRATED STEEL	0.015	66.5	135.3	0.037	72281	4499399	0.021	-43706	144894	101188	23.00						
NO.24 GRAY IRON FOUNDRY	0.020	3.1	13.7	0.167	93264	394334	0.031	-10475	14699	4224	2.94						
NO.25 COPPER	0.132	21.2	45.3	0.157	92137	1075354	0.185	-22217	48524	26307	2.86						
NO.26 MOTOR VEHICLE	0.139	23.9	51.8	0.162	77029	1309909	0.213	-21277	55419	34142	5.26						
TOTAL -- ALL					2000	2832	8200758	55497504	-870348	3036795	2166447						
FUEL SAVINGS CASES ONLY					2000	2832	8200758	55497504	-870348	3036795	2166447						
UTILITY SAVINGS CASES ONLY					1635	2319	8410010	51983372	-868981	3023107	2154126						
EMISSIONS SAVINGS CASE ONLY					11	8	-191423	3221978	861	8676	9537						
FUEL & COST SAVINGS CASES					1633	2819	8410010	51983372	-868981	3023107	2154126						
UTILITY & EMISSIONS SAVINGS					0	0	0	0	0	0	0						

YEAR : 1990
 NR.16 ADVANCED TECHNOLOGY,GAS TURBINE,INDIRECT FIRED,COAL(AFB)
 NATIONAL SUMMARY

07

*** STRATEGY OPTIMUM

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		

					PLANT	UTILITY	TOTAL
TOTAL -- ALL	5949	8240	29981568	162323680	-2492754	8941046	6448294
FUEL SAVINGS CASES ONLY	5949	8240	29981568	162323680	-2492754	8941046	6448294
COST SAVINGS CASES ONLY	5924	8215	30282672	155617120	-2490134	8914809	6424675
EMISSIONS SAVINGS CASE ONLY	20	16	-366931	6175921	1650	16630	16280
FUEL & COST SAVINGS CASES	5924	8215	30282672	155617120	-2490134	8914809	6424675
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE	COAL FUEL	FUEL

SITE PLUS UTILITY								
TOTAL -- ALL	14654	-425	6082	0	0	0	-16559	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	0	-16559	2197
COST SAVINGS CASES ONLY	14639	-425	6069	0	0	0	-16529	2171
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	0	-16	13
FUEL & COST SAVINGS CASES	14639	-425	6069	0	0	0	-16529	2171
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION								
TOTAL -- ALL	14654	-425	6082	0	0	0	-16559	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	0	-16559	2197
COST SAVINGS CASES ONLY	14639	-425	6069	0	0	0	-16529	2171
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	0	-16	13
FUEL & COST SAVINGS CASES	14639	-425	6069	0	0	0	-16529	2171
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO.17 ADVANCED TECHNOLOGY GAS TURBINE-CLOSED CYCLE, COAL DER. B.G.									
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	*** STRATEGY OPTIMUM			01 ECS SIZE (MM)
						CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS PLANT UTILITY	
NO.01 MEAT PACKING	0.160	50.3	62.8	-0.006	-2383	1221024	0.508	-24546	63988 7.48
NO.02 BAKING	0.195	8.4	18.9	-0.375	-53628	639885	0.468	-7693	12479 0.17*
NO.03 MALT BEVERAGE	0.286	29.1	49.5	-0.069	-18109	720518	0.423	-15610	37381 2.81*
NO.04 WOVEN FABRIC MILL	0.230	24.8	63.8	-0.056	-22399	1027261	0.387	-28645	39665 1.49*
NO.05 SAW MILL	0.182	20.5	7.8	0.032	16486	1429702	0.152	8785	17097 0.01*
NO.06 PULP MILL	0.222	26.7	59.2	0.113	49096	412486	0.331	-22826	61335 36510 42.72
NO.07 WRITING PAPER MILL	0.301	43.5	109.0	0.041	19880	910414	0.470	-52214	137110 84896 32.31
NO.08 CORRUGATED PAPER	0.312	280.5	599.3	0.000	526	3823649	0.476	-233779	637501 403722 86.11
NO.09 BOX BOARD	0.317	77.2	161.1	0.055	31663	1052130	0.479	-61341	170827 109486 82.68
NO.10 CHLORINE	0.302	201.7	427.3	0.157	390616	2904089	0.445	-168647	462967 294320 37.37
NO.11 ALUMINA	0.191	35.9	109.3	-0.155	-68736	737353	0.370	-53327	115931 62603 51.23
NO.12 LOW DENS. POLYETHYL	0.134	23.4	61.9	0.039	24729	519472	0.214	-28310	66221 37912 7.37
NO.13 HI DENS. POLYETHYL	0.270	20.6	53.7	0.091	25652	421989	0.451	-24378	57565 33188 9.50
NO.14 POLYVINYL CHLORIDE	0.291	37.9	93.5	0.050	21061	749391	0.457	-41002	100023 59022 8.21
NO.15 STYRENE-BUT. RUB.	0.259	10.3	24.9	-0.246	-17772	208414	0.429	-10971	26755 15783 9.19
NO.16 NYLON	0.260	7.5	18.8	0.065	6924	181744	0.424	-8296	20166 11871 2.59*
NO.17 STYRENE	0.116	26.4	47.0	-0.078	-52629	535353	0.212	-17451	50253 32802 20.84
NO.18 ETHYLENE	0.069	85.0	102.1	-0.007	-26999	1190282	0.081	-33242	104859 71617 15.20
NO.19 PETROLEUM REFINING	0.139	755.0	1671.2	-0.065	-962184	12064640	0.237	-732119	1788006 1056687 70.31
NO.20 TILES	0.291	49.8	120.1	-0.113	-45750	1140437	0.458	-52341	128478 76137 13.33
NO.21 INTEGRATED STEEL	0.042	193.1	497.4	0.017	181460	7105493	0.065	-207167	521814 314647 67.47
NO.24 GR. IRON FOUNDRY	0.019	2.9	6.7	-0.019	-10922	121936	0.018	-4607	7114 2507 1.39*
NO.25 COPPER	0.235	45.6	77.1	0.108	63401	914451	0.406	-24636	82514 57878 4.71*
NO.26 MOTOR VEHICLE	0.254	77.8	191.3	-0.134	-101172	1853044	0.459	-83798	204892 121094 19.11
TOTAL - ALL		2135	4642		-551092	41635039		-1928158	4993441 3055281
FUEL SAVINGS CASES ONLY		2135	4642		-551092	41635039		-1928158	4993441 3055281
FUEL SAVINGS CASES ONLY		930	2155		831493	20424992		-863809	2326353 1462546
EMISSIONS SAVINGS CASE ONLY		20	8		16426	1429702		8785	8312 17097
FUEL & COST SAVINGS CASES		930	2155		831493	20424992		-863809	2326353 1462546
FUEL/COST & EMISSION SAVINGS		20	8		16426	1429702		8785	8312 17097

YEAR : 1990
 NO.17 ADVANCED TECHNOLOGY,GAS TURBINE,CLOSED CYCLE, COAL DER. B.G. *** STRATEGY OPTIMUM
 NATIONAL SUMMARY

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT UTILITY	TONS PER YEAR	TOTAL
TOTAL -- ALL	7028	15189	-624176	129017216	-6374433	16502834	10128367
FUEL SAVINGS CASES ONLY	7023	15183	-624176	129017216	-6374433	16502834	10128367
COST SAVINGS CASES ONLY	3953	8747	2911786	73168816	-3618447	9640634	6022163
EMISSIONS SAVINGS CASE ONLY	39	15	31601	2740467	16839	15932	32771
FUEL & COST SAVINGS CASES	3953	8747	2911786	73168816	-3618447	9640634	6022163
FUEL,COST & EMISSION SAVING	39	15	31601	2740467	16839	15932	32771

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		TOTAL		
	NATURAL PETROLEUM	PETROLEUM	COAL	DERIVED	COAL	OTHER	FUEL
	GAS	DISTILLATE	BOILER	FUEL	FUEL	SAVINGS	
TOTAL -- ALL	14654	-425	6082	0	-29453	13973	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-29453	13973	2197
COST SAVINGS CASES ONLY	3112	0	1748	0	-8581	6965	710
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	-15	18	13
FUEL & COST SAVINGS CASES	3112	0	1748	0	-8591	6965	710
FUEL,COST & EMISSION SAVING	15	0	8	0	-15	18	13

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-29453	13973	2197	7028
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-29453	13973	2197	7028
COST SAVINGS CASES ONLY	3112	0	1748	0	-8581	6965	710	3953
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	-15	18	13	39
FUEL & COST SAVINGS CASES	3112	0	1748	0	-8591	6965	710	3953
FUEL,COST & EMISSION SAVING	15	0	8	0	-15	18	13	39

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	913	2197	3110
FUEL SAVINGS CASES ONLY	0	0	0	0	0	913	2197	3110
COST SAVINGS CASES ONLY	0	0	0	0	0	1648	710	2358
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	30	13	43
FUEL & COST SAVINGS CASES	0	0	0	0	0	1648	710	2358
FUEL,COST & EMISSION SAVING	0	0	0	0	0	30	13	43

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL															
INDUSTRY	NO. 19 ADVANCED TECHNOLOGY GAS TURBINE-CLOSED CYCLE COAL (AFB)					*** STRATEGY OPTIMUM					EMISSIONS SAVINGS				ECS SIZE (MM)
	FUEL ENERGY TOTAL					CAPITAL EMISSIONS					---- TONS PER YEAR ----				
	SAVINGS RATIO	SAVINGS	FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	COST \$000	SAVINGS RATIO	PLANT	UTILITY	TOTAL	PLANT	UTILITY	TOTAL		
NO. 01 MEAT PACKING	0.279	31.6	56.6	0.118	45990	14750.9	0.400	-21382	60539	39156	5.23				
NO. 02 BAKING	0.113	4.5	11.0	-0.284	-40549	636407	0.289	-5699	12636	6737	0.11*				
NO. 03 MALT BEVERAGE	0.130	22.0	70.3	-0.005	-1187	1223002	0.332	-36480	75209	36729	4.10*				
NO. 04 NOVEN FABRIC MILL	0.055	6.0	17.5	-0.074	-29363	978128	0.087	-9834	18703	8869	0.42*				
NO. 05 SAW MILL	0.163	18.3	8.2	-0.271	-138582	2882653	0.136	6599	8749	15348	0.01*				
NO. 06 NEWSPRINT MILL	0.269	32.3	68.2	0.283	123346	608436	0.380	-27651	71770	44119	51.19				
NO. 07 WRITING PAPER MILL	0.376	41.9	59.1	0.352	172443	952543	0.480	-17708	74301	56593	18.90				
NO. 08 CORRUGATED PAPER	0.273	137.9	205.4	0.362	680514	2717434	0.361	-63713	218524	154811	47.47				
NO. 09 BOX BOARD	0.360	55.8	72.5	0.366	221799	931703	0.452	-16029	76864	60835	39.97				
NO. 10 CHLORINE	0.157	105.3	241.0	0.116	497333	2579134	0.226	-111528	261098	149570	21.52				
NO. 11 ALUMINA	0.029	4.8	87.7	-0.005	-2271	852992	0.201	-64329	93905	29585	43.18				
NO. 12 ICA DENS. POLYETHYL	0.040	6.9	22.5	0.052	33375	446009	0.064	-12724	24123	11399	2.74*				
NO. 13 HI DENS. POLYETHYL	0.063	4.8	14.1	0.077	21647	354923	0.096	-8021	15076	7057	2.44*				
NO. 14 POLYVINYL CHLORIDE	0.076	6.7	25.5	0.090	39141	658693	0.118	-14539	27320	12781	2.31*				
NO. 15 STYRENE-UT. RUB.	0.162	4.6	13.5	0.072	5230	217419	0.290	-7367	14493	7126	5.08				
NO. 16 NYLON	0.068	2.0	6.2	0.067	7161	164784	0.115	-3457	6678	3221	1.21*				
NO. 17 STYRENE	0.074	16.8	46.1	0.230	155866	639520	0.155	-25579	49312	23733	20.88				
NO. 18 ETHYLENE	0.032	40.1	100.6	0.360	1459901	2147510	0.039	-69266	103277	34011	15.25				
NO. 19 PETROLEUM REFINING	0.039	164.6	459.8	0.354	5215237	8524071	0.057	-311962	492203	180241	29.79				
NO. 20 TIRES	0.058	10.7	55.6	0.137	55500	1056328	0.241	-36202	59693	23490	7.29				
NO. 21 INTEGRATED STEEL	0.010	45.0	397.9	0.013	136712	6356731	0.035	-256959	426055	169096	68.25				
NO. 24 GRAY IRON FURNACE	-0.004	-0.6	2.9	0.175	97646	193772	-0.011	-4591	3152	-1439	0.63*				
NO. 25 COTTON	0.049	15.0	46.0	0.134	78743	1110249	0.159	-26575	49243	22668	2.92*				
NO. 26 MOTOR VEHICLE	0.040	18.7	54.5	0.065	49577	1376356	0.171	-30968	58371	27404	5.61				

TOTAL FOR ALL		743	2144		8874184	34035792		-1179153	2301289	1123135					
FUEL SAVING CASES ONLY		743	2144		8874184	34035792		-1179153	2301289	1123135					
EMISSIONS SAVING CASES ONLY		0	1443		9881067	30510640		-1066221	2092087	1025069					
EMISSIONS SAVING CASES ONLY		13	6		-13152	2882653		6599	8749	15348					
EMISSIONS SAVING CASES ONLY		743	1445		8452412	32116150		-1061629	2083935	1027308					
EMISSIONS SAVING CASES ONLY		0	0		0	0		0	0	0					

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO.18 ADVANCED TECHNOLOGY GAS TURBINE,CLOSED CYCLE,COAL(AFB) *** STRATEGY OPTIMUM 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS --- TONS PER YEAR --- PLANT UTILITY TOTAL
TOTAL -- ALL	3316	8864	31488208	129593184	-4167230 8745311 4578065
FUEL SAVINGS CASES ONLY	3317	8058	31301040	129221776	-4158430 8739269 4580826
COST SAVINGS CASES ONLY	3169	6949	31913664	109790720	-3409541 7551365 4141794
EMISSIONS SAVINGS CASE ONLY	35	16	-265635	5525499	12649 16770 29419
FUEL & COST SAVINGS CASES	3170	6943	31726496	109419328	-3400741 7545303 4144554
FUEL,COST & EMISSION SAVING	0	0	0	0	0 0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS SAVINGS 10**12 BTU	PETROLEUM SAVINGS 10**12 BTU	COAL SAVINGS 10**12 BTU	TOTAL FUEL SAVINGS
TOTAL -- ALL	14654	425	6082	19192
FUEL SAVINGS CASES ONLY	14593	425	6078	19039
COST SAVINGS CASES ONLY	14143	17	5626	18741
EMISSIONS SAVINGS CASE ONLY	15	0	8	13
FUEL & COST SAVINGS CASES	14072	17	5622	18587
FUEL,COST & EMISSION SAVING	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	425	6082	19192
FUEL SAVINGS CASES ONLY	14593	425	6078	19039
COST SAVINGS CASES ONLY	14143	17	5626	18741
EMISSIONS SAVINGS CASE ONLY	15	0	8	13
FUEL & COST SAVINGS CASES	14072	17	5622	18587
FUEL,COST & EMISSION SAVING	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	425	6082	19192
FUEL SAVINGS CASES ONLY	14593	425	6078	19039
COST SAVINGS CASES ONLY	14143	17	5626	18741
EMISSIONS SAVINGS CASE ONLY	15	0	8	13
FUEL & COST SAVINGS CASES	14072	17	5622	18587
FUEL,COST & EMISSION SAVING	0	0	0	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY OPTIMUM										01	
NO. 19 ADVANCED TECHNOLOGY, STEAM INJECT. G.T., DIR. FIRED, PETROLEUM B.G.										CAPITAL EMISSIONS										ECS	
INDUSTRY	FUEL ENERGY TOTAL		SAVINGS FUEL		SAVINGS RATIO		SAVINGS RATIO		COST \$000	SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		TOTAL	
	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO		SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	PLANT	UTILITY
NO. 01 MEAT PACKING	0.305	62.3	147.3	-0.062	-24008				728294	0.526	-57016	157529	100512	13.05							
NO. 02 BAKING	0.217	10.8	25.5	-0.120	-17082				237333	0.527	-9837	27275	17437	0.22*							
NO. 03 MALT BEVERAGE	0.307	58.6	138.4	-0.137	-36056				429234	0.527	-53374	148007	94633	7.66*							
NO. 04 MOVEN FABRIC MILL	0.300	32.3	77.8	0.140	55824				440956	0.526	-30421	83274	52053	1.90*							
NO. 05 SAW MILL	0.277	31.1	91.7	-0.017	-8641				1854001	0.521	-40240	98163	57924	0.20*							
NO. 06 NEWSPRINT MILL	0.288	34.5	91.4	0.193	84101				4322	0.517	-37253	96292	59039	69.01							
NO. 07 WRITING PAPER MILL	0.310	61.8	146.9	0.078	38006				428096	0.527	-66728	184749	118021	42.50							
NO. 08 CORRUGATED PAPER	0.310	354.8	843.9	0.002	2930				1826284	0.527	-325087	897771	572684	118.51							
NO. 09 BOX BOARD	0.309	97.5	232.9	0.039	22686				521868	0.527	-89652	246951	157299	116.89							
NO. 10 CHLORINE	0.372	248.9	499.1	0.276	684158				1172723	0.571	-170486	540819	370333	44.64							
NO. 11 ALUMINA	0.228	48.6	133.8	-0.068	-29970				291880	0.445	-56994	143242	86248	62.32							
NO. 12 LOW DENS. POLYETHYL	0.244	42.6	148.6	0.126	80528				394322	0.507	-70090	159056	88966	18.17							
NO. 13 HI DENS. POLYETHYL	0.311	26.8	63.5	0.185	51874				171519	0.527	-24646	68013	43368	10.37							
NO. 14 POLYVINYL CHLORIDE	0.312	48.8	114.7	0.143	60482				313920	0.527	-44178	122616	78438	9.79*							
NO. 15 STYRENE-OUT. RUB.	0.290	13.2	30.8	-0.102	-7401				92102	0.499	-11918	32996	21078	11.02							
NO. 16 NYLON	0.312	9.7	22.8	0.180	19203				82073	0.528	-8761	24430	15670	4.23*							
NO. 17 STYRENE	0.079	18.2	48.3	-0.097	-59016				235783	0.203	-22145	51628	29483	20.93							
NO. 18 ETHYLENE	0.041	51.2	96.8	-0.030	-121843				831527	0.064	-48243	99423	51180	15.22							
NO. 19 PETROLEUM REFINING	0.247	1604.9	2711.4	0.043	638066				7476729	0.397	-798468	2902292	2103815	112.15							
NO. 20 TILES	0.312	63.0	148.2	0.045	18106				454685	0.528	-56978	158603	101625	16.01							
NO. 23 INTEGRATED STEEL	0.043	196.5	487.4	0.050	537096				3508153	0.070	-183699	521814	338115	98.65							
NO. 24 GRAY IRON FOUNDRY	0.191	29.6	74.2	0.104	58023				231982	0.372	-31112	79390	48279	17.23							
NO. 25 COPPER	0.312	91.1	214.1	0.056	32892				567601	0.527	-82854	229128	146274	12.82							
NO. 26 MOTOR VEHICLE	0.286	100.2	235.5	0.004	2969				743093	0.527	-90878	252165	161286	22.87							
TOTAL -- ALL		3337	6825		2082804				23248432		-2411052	7325609	4914551								
FUEL SAVINGS CASES ONLY		3337	6825		2082804				23248432		-2411052	7325609	4914551								
COST SAVINGS CASES ONLY		3043	6112		2306821				18540288		-2111289	6567349	4456059								
EMISSIONS SAVINGS CASE ONLY		0	0		0				0		0	0	0								
FUEL & COST SAVINGS CASES		3043	6112		2306821				18540288		-2111289	6567349	4456059								
FUEL, COST & EMISSIONS SAVING		0	0		0				0		0	0	0								

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.19 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIR. FIRED, PETROLEUM B.G.

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	SAVINGS	10**12 BTU	DOLLARS \$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	9865	21587			5439202		68994672		-8199545	23443024
FUEL SAVINGS CASES ONLY	9865	21587			5439202		68994672		-8199545	23443024
COST SAVINGS CASES ONLY	8543	18394			7056858		52331280		-6809476	20056624
EMISSIONS SAVINGS CASE ONLY	0	0			0		0		0	0
FUEL & COST SAVINGS CASES	8543	18394			7056858		52331280		-6809476	20056624
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	-26933	0	0	0	20372	2197
FUEL SAVINGS CASES ONLY	14654	-425	-26933	0	0	0	20372	2197
COST SAVINGS CASES ONLY	7083	0	-17747	0	0	0	17093	2114
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7083	0	-17747	0	0	0	17093	2114
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	-26933	0	0	0	20372	2197	9865
FUEL SAVINGS CASES ONLY	14654	-425	-26933	0	0	0	20372	2197	9865
COST SAVINGS CASES ONLY	7083	0	-17747	0	0	0	17093	2114	8543
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7083	0	-17747	0	0	0	17093	2114	8543
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	-26933	0	0	0	20372	2197	9865
FUEL SAVINGS CASES ONLY	14654	-425	-26933	0	0	0	20372	2197	9865
COST SAVINGS CASES ONLY	7083	0	-17747	0	0	0	17093	2114	8543
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7083	0	-17747	0	0	0	17093	2114	8543
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY OPTIMUM				EMISSIONS SAVINGS		ECS	
NO.20 ADVANCED TECHNOLOGY STEAM INJECT. G/T. DIR. FIRED, COAL DER. B.G.										CAPITAL COST \$000	EMISSIONS SAVINGS \$000	RATIO	SAVINGS \$000	---- TONS PER YEAR		TOTAL	SIZE (PHI)
INDUSTRY	FUEL SAVING	ENERGY TOTAL	UTILITY FUEL	COST RATIO	SAVINGS \$000	SAVINGS \$000	SAVINGS \$000	SAVINGS \$000	SAVINGS \$000					PLANT	UTILITY		
NO.01 HEAT PACKING	0.305	62.3	147.3	-0.062	-24008					728294	0.489		-24008	-62173	157529	95356	13.05
NO.02 BAKING	0.217	10.8	25.5	-0.120	-17092					237333	0.490		-17092	-10726	27275	16548	0.22*
NO.03 MALT BEVERAGE	0.307	58.6	138.4	-0.137	-36056					429234	0.490		-36056	-58197	148007	89810	7.66*
NO.04 WOVEN FABRIC MILL	0.300	32.3	77.8	0.140	55624					440956	0.489		55624	-33182	83275	50093	1.90*
NO.05 SAW MILL	0.277	31.1	91.7	-0.017	-8641					1854001	0.481		-8641	-44039	98163	54125	0.20*
NO.06 NEWSPRINT MILL	0.289	34.5	91.4	0.193	84101					214322	0.479		84101	-40682	96292	55609	69.01
NO.07 WRITING PAPER MILL	0.310	61.8	146.9	0.078	38086					428096	0.490		38086	-72767	184749	111983	42.50
NO.08 CORRUGATED PAPER	0.310	354.8	843.9	0.002	2930					1826284	0.490		2930	-354522	897771	543249	118.51
NO.09 BOX BOARD	0.309	97.5	232.9	0.039	22686					521868	0.490		22686	-97775	246951	149176	116.89
NO.10 CHLORINE	0.372	248.9	499.1	0.276	684158					1172723	0.537		684158	-185788	540818	355030	44.64
NO.11 ALUMINA	0.228	48.6	133.8	-0.068	-29970					291880	0.412		-29970	-62279	143242	80964	62.32
NO.12 LOW DENS. POLYETHYL	0.244	42.6	148.6	0.126	80528					394322	0.464		80528	-76802	159056	82254	18.17
NO.13 HI DENS. POLYETHYL	0.311	26.8	63.5	0.185	51874					171519	0.490		51874	-26877	68013	41136	10.37
NO.14 POLYVINYL CHLORIDE	0.312	48.8	114.7	0.143	60492					313920	0.491		60492	-48173	122616	74444	9.79*
NO.15 STYRENE-BUT. RUB.	0.290	13.2	30.8	-0.102	-7401					92102	0.465		-7401	-12996	32996	20000	11.02
NO.16 NYLON	0.312	9.7	22.8	0.180	19203					82073	0.492		19203	-9552	24430	14878	4.23*
NO.17 STYRENE	0.079	18.2	48.3	-0.087	-59016					235783	0.176		-59016	-24230	51628	27398	20.93
NO.18 ETHYLENE	0.041	51.2	96.8	-0.030	-121826					831474	0.053		-121826	-52811	99424	46613	15.22
NO.19 PETROLEUM REFINING	0.248	1612.6	2711.2	0.045	667329					7470104	0.367		667329	-858786	2902105	2043320	112.14
NO.20 TIRES	0.312	63.0	148.2	0.045	18106					454685	0.491		18106	-62126	158603	96477	16.01
NO.23 INTEGRATED STEEL	0.043	196.5	487.4	0.050	537096					3508153	0.066		537096	-201930	521814	319885	98.65
NO.24 GRAY IRON FOUNDRY	0.190	29.4	74.2	0.103	57307					232014	0.334		57307	-34157	79390	45234	17.23
NO.25 COPPER	0.312	91.1	214.1	0.056	32892					567601	0.490		32892	-90352	229128	138776	12.82
NO.26 MOTOR VEHICLE	0.286	100.2	235.5	0.004	2969					743093	0.491		2969	-99096	252165	153069	22.87
TOTAL -- ALL		3344	6825		2111368					23241776			2111368	-2620008	7325433	4705416	
FUEL SAVINGS CASES ONLY		3344	6825		2111368					23241776			2111368	-2620008	7325433	4705416	
COST SAVINGS CASES ONLY		3050	6112		2415368					18541696			2415368	-2292562	6567172	4274607	
EMISSIONS SAVINGS CASE ONLY		0	0		0					0			0	0	0	0	
FUEL & COST SAVINGS CASES		3050	6112		2415368					18541696			2415368	-2292562	6567172	4274607	
FUEL COST & EMISSION SAVING		0	0		0					0			0	0	0	0	

YEAR : 1990
 NO.20 ADVANCED TECHNOLOGY,STEAM INJECT.G/T,DIR.FIRED,COAL DER. B.G. *** STRATEGY OPTIMUM 07

COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	9879	21586	5494048	68981648	-8928058	23442704	14514632
FUEL SAVINGS CASES ONLY	9879	21586	5494048	68981648	-8928058	23442704	14514632
COST SAVINGS CASES ONLY	8557	18394	7111577	52318640	-7408826	20056288	12647454
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	8557	18394	7111577	52318640	-7408826	20056288	12647454
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS				COAL DERIVED			TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	10**12 BTU	COAL	DISTILLATE	BOILER FUEL	
TOTAL -- ALL	14654	-425	6082	0	-33001	20372	2197	9879
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-33001	20372	2197	9879
COST SAVINGS CASES ONLY	7083	0	3623	0	-21356	17093	2114	8557
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7083	0	3623	0	-21356	17093	2114	8557
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-33001	20372	2197	9879
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-33001	20372	2197	9879
COST SAVINGS CASES ONLY	7083	0	3623	0	-21356	17093	2114	8557
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7083	0	3623	0	-21356	17093	2114	8557
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	2244	2197	4441
FUEL SAVINGS CASES ONLY	0	0	0	0	0	2244	2197	4441
COST SAVINGS CASES ONLY	0	0	0	0	0	1879	2114	3993
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	1879	2114	3993
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY OPTIMUM				EMISSIONS SAVINGS		01	
NO. 21 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIRECT FIRED, COAL(PFB)										CAPITAL COST		EMISSIONS SAVINGS		-----		ECS	
INDUSTRY										\$000		RATIO		PLANT		TOTAL	
										RATIO		RATIO		UTILITY		TOTAL	
										RATIO		RATIO		UTILITY		TOTAL	
										RATIO		RATIO		UTILITY		TOTAL	
										RATIO		RATIO		UTILITY		TOTAL	
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										RATIO		RATIO		UTILITY		TOTAL	
										RATIO		RATIO		UTILITY		TOTAL	
										RATIO		RATIO		UTILITY			

YEAR : 1990
 NO.21 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIRECT FIRED, COAL (PFB)
 NATIONAL SUMMARY
 *** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	TONS PER YEAR	TOTAL
---	---	---	---	---	---	---	---
TOTAL -- ALL	4248	21070	18852816	232933584	-12191320	22907088	10715756
FUEL SAVINGS CASES ONLY	4248	21070	18852816	232933584	-12191320	22907088	10715756
COST SAVINGS CASES ONLY	3191	13291	21685424	149951856	-7502944	14613218	7110264
EMISSIONS SAVINGS CASE ONLY	39	17	-176027	4693661	15385	18124	33510
FUEL & COST SAVINGS CASES	3191	13291	21685424	149951856	-7502944	14613218	7110264
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	COAL	OTHER	FUEL
---	---	---	---	---	---	---
TOTAL -- ALL	14654	-425	6082	0	-18260	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-18260	2197
COST SAVINGS CASES ONLY	13172	0	5030	0	-17126	2116
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	2	13
FUEL & COST SAVINGS CASES	13172	0	5030	0	-17126	2116
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-18260	2197	4248
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-18260	2197	4248
COST SAVINGS CASES ONLY	13172	0	5030	0	-17126	2116	3191
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	2	13	39
FUEL & COST SAVINGS CASES	13172	0	5030	0	-17126	2116	3191
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	-18260	2197	4248
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-18260	2197	4248
COST SAVINGS CASES ONLY	13172	0	5030	0	-17126	2116	3191
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	2	13	39
FUEL & COST SAVINGS CASES	13172	0	5030	0	-17126	2116	3191
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL													
INDUSTRY	NO.22 ADVANCED TECHNOLOGY,STEAM INJECTED G/T,INDIRECT FIRED,COAL(AFB)				*** STRATEGY OPTIMUM			EMISSIONS SAVINGS			01 ECS SIZE (MM)		
	FUEL ENERGY TOTAL		UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		SAVINGS RATIO			PLANT UTILITY	
	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	PLANT	UTILITY		TOTAL	
NO.01 MEAT PACKING	0.123	17.4	84.8	-0.125	-48725	1933996	0.293	-53172	90742	37570	7.87*		
NO.02 BAKING	0.014	0.6	2.9	-0.054	-7710	132686	0.049	-1929	3064	1135	0.03*		
NO.03 MALT BEVERAGE	0.003	0.2	1.8	0.198	52237	255351	-0.003	-2049	1903	-146	0.10*		
NO.04 WOVEN FABRIC MILL	-0.004	-0.4	7.1	0.037	14696	326667	0.014	-6197	7630	1433	0.17*		
NO.05 SAW MILL	0.179	20.1	3.7	-0.163	-83387	2323777	0.136	11324	3948	15272	0.01*		
NO.06 NEWSPRINT HILL	0.024	2.8	16.7	0.100	43811	235938	0.058	-10936	17635	6698	12.49		
NO.07 WRITING PAPER MILL	0.037	4.2	16.3	0.181	88736	400581	0.073	-11902	20496	8594	4.86*		
NO.08 CORRUGATED PAPER	0.060	30.1	130.9	0.261	490133	1751047	0.132	-82409	139231	56822	28.68		
NO.09 BOX BOARD	0.065	10.0	46.2	0.237	136419	613912	0.148	-29025	48967	19942	24.08		
NO.10 CHLORINE	0.051	33.9	45.7	0.116	286706	920746	0.053	-14150	49492	35342	4.04*		
NO.11 ALUMINA	-0.071	-7.9	3.3	0.078	34511	138966	-0.065	-9195	3529	-5665	1.41*		
NO.12 LOW DENS. POLYETHYL	-0.006	-1.1	13.6	0.031	19646	312325	0.016	-11648	14524	2876	1.64*		
NO.13 HI DENS. POLYETHYL	-0.004	-0.3	4.9	0.080	22555	165229	0.012	-4409	5271	862	0.84*		
NO.14 POLYVINYL CHLORIDE	-0.002	-0.3	6.8	0.100	42289	272983	0.010	-6190	7234	1044	0.60*		
NO.15 STYRENE-BUT. RUB.	0.010	0.2	0.4	0.172	12462	50334	-0.007	-488	390	-97	0.13*		
NO.16 NYLON	-0.004	-0.1	1.9	0.070	7436	71690	0.014	-1645	2035	389	0.37*		
NO.17 STYRENE	0.001	0.1	11.0	0.242	164044	337098	0.008	-10880	11734	874	4.88*		
NO.18 ETHYLENE	0.045	56.9	94.7	0.368	1491551	2120717	0.052	-51448	97239	45791	15.17		
NO.19 PETROLEUM REFINING	0.127	813.1	2601.5	0.254	3742849	26702992	0.242	-1466720	2784656	1317936	112.57		
NO.20 TIRES	0.000	0.0	5.2	0.141	57048	316191	0.007	-4846	5551	704	0.57*		
NO.23 INTEGRATED STEEL	-0.003	-11.6	44.2	-0.003	-35770	3161298	0.003	-33955	47355	13401	7.52*		
NO.24 GRAY IRON FOUNDRY	0.050	7.7	26.8	0.205	114480	430229	0.087	-16771	28635	11863	5.55*		
NO.25 COPPER	0.000	0.0	7.6	0.142	83267	408745	0.003	-7725	8137	412	0.47*		
NO.26 MOTOR VEHICLE	0.000	-0.1	8.7	0.081	61560	481327	0.006	-8405	9302	898	0.87*		
<hr/>													
TOTAL -- ALL		976	3187		6790837	43864768		-1834748	3408697	1573945			
FUEL SAVINGS CASES ONLY		997	3083		6483603	38209392		-1740536	3298131	1557594			
COST SAVINGS CASES ONLY		949	3051		6486428	36313003		-1757017	3263588	1506568			
EMISSIONS SAVINGS CASE ONLY		20	4		-83367	2323777		11324	3948	15272			
FUEL & COST SAVINGS CASES		959	2992		6623425	33818920		-1696759	3200377	1503618			
FUEL,COST & EMISSION SAVING		0	0		0	0		0	0	0			

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO.22 ADVANCED TECHNOLOGY, STEAM INJECTED G/T, INDIRECT FIRED, COAL (AFB) *** STRATEGY OPTIMUM 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU			CAPITAL COST \$000		EMISSIONS SAVINGS		
	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	10**12 BTU	COST	\$000	PLANT	UTILITY	TOTAL
--- ALL	2298	7580		113702112		-4508209	8119886	3611669
FUEL SAVINGS CASES ONLY	2412	7272		99179600		-4178042	7790874	3612829
COST SAVINGS CASES ONLY	2247	7320		99226944		-4352212	7841740	3482520
EMISSIONS SAVINGS CASE ONLY	39	7		4454239		21705	7568	29273
FUEL & COST SAVINGS CASES	2339	7097		90763904		-4094130	7603498	3509367
FUEL, COST & EMISSION SAVING	0	0		0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU			COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	10**12 BTU	COAL	OTHER	COAL FUEL	OTHER SAVINGS
---	14654	-425	6082	0	0	-20210	2197
FUEL SAVINGS CASES ONLY	12246	-17	4937	0	0	-16223	1470
COST SAVINGS CASES ONLY	13112	-425	5480	0	0	-17436	1516
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	2	13
FUEL & COST SAVINGS CASES	12170	-17	4908	0	0	-16162	1440
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL --- ALL	14654	-425	6082	0	0	-20210	2197	2298
FUEL SAVINGS CASES ONLY	12246	-17	4937	0	0	-16223	1470	2412
COST SAVINGS CASES ONLY	13112	-425	5480	0	0	-17436	1516	2247
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	2	13	39
FUEL & COST SAVINGS CASES	12170	-17	4908	0	0	-16162	1440	2339
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL --- ALL	14654	-425	6082	0	0	-20210	2197	2298
FUEL SAVINGS CASES ONLY	12246	-17	4937	0	0	-16223	1470	2412
COST SAVINGS CASES ONLY	13112	-425	5480	0	0	-17436	1516	2247
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	2	13	39
FUEL & COST SAVINGS CASES	12170	-17	4908	0	0	-16162	1440	2339
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 23 ADVANCED TECHNOLOGY, COND. CYCLE, DIRECT FIRED, PETROLEUM B.G.				*** STRATEGY OPTIMUM			EMISSIONS SAVINGS		EMISSIONS SAVINGS		ECS SIZE (MM)
	FULL ENERGY		COST		CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	TOTAL	TOTAL		
	SAVINGS RATIO	SAVINGS	SAVINGS RATIO	SAVINGS \$000								
NO. 01 MEAT PACKING	0.345	64.8	188.7	-0.216	-84047	1467711	0.563	-69442	201865	132423	16.81	
NO. 02 BAKING	0.287	40.1	115.3	-1.382	-197365	1579563	0.572	-49508	123391	73883	0.99*	
NO. 03 MALT BEVERAGE	0.347	79.8	177.7	-0.242	-63683	836839	0.563	-65232	190103	124870	9.88*	
NO. 04 WOVEN FABRIC MILL	0.342	44.0	99.0	0.025	9895	977814	0.563	-36603	105948	69344	2.25*	
NO. 05 SAW MILL	0.403	45.3	91.7	-0.274	-140203	3682220	0.605	-30935	98163	67228	0.20*	
NO. 06 NEWSPRINT MILL	0.350	46.0	102.9	0.223	97297	318814	0.563	-37222	106322	71100	74.15	
NO. 07 WRITING PAPER MILL	0.350	84.2	188.4	0.047	23191	742969	0.563	-81425	236980	155554	54.82	
NO. 08 CORRUGATED PAPER	0.350	484.1	1083.6	-0.020	-38204	3042255	0.563	-396991	1152785	755795	114.76	
NO. 09 BOX BOARD	0.349	133.0	298.6	0.018	10625	865100	0.563	-109258	316651	207393	100.47	
NO. 10 CHLORINE	0.389	260.4	499.1	0.272	674450	1766361	0.582	-162881	540819	377938	44.88	
NO. 11 ALUMINA	0.287	103.8	281.9	-0.284	-125662	774850	0.522	-117929	301809	183879	132.71	
NO. 12 LOW DENS. POLYETHYL	0.339	59.7	150.3	0.186	119066	630284	0.569	-59983	160849	100866	17.55	
NO. 13 HI DENS. POLYETHYL	0.352	36.3	80.6	0.144	40570	353461	0.564	-26003	86327	56724	13.24	
NO. 14 POLYVINYL CHLORIDE	0.352	66.4	147.3	0.089	37664	650587	0.564	-54013	157508	103495	12.64	
NO. 15 STYRENE-BUT. RUB.	0.330	17.8	39.2	-0.194	-14055	188071	0.538	-14451	42058	27607	14.12	
NO. 16 NYLON	0.351	13.1	29.1	0.110	11665	178695	0.564	-10667	31227	20561	5.44*	
NO. 17 STYRENE	0.084	19.2	47.7	-0.090	-61095	389489	0.207	-21098	51051	29952	20.79	
NO. 18 ETHYLENE	0.033	41.5	90.3	-0.047	-192337	1222093	0.054	-50188	92765	42577	15.19	
NO. 19 PETROLEUM REFINING	0.268	1740.5	2696.1	0.066	969049	9788127	0.414	-698535	2885935	2187401	112.11	
NO. 20 TIRES	0.352	85.6	190.0	-0.028	-11315	889560	0.564	-69551	203305	133754	20.64	
NO. 23 INTEGRATED STEEL	0.046	207.7	487.4	0.050	531504	4039773	0.071	-176387	521614	345427	99.18	
NO. 24 GRAY IRON FOUNDRY	0.309	70.8	149.6	0.090	50147	550954	0.506	-53531	159959	106428	29.68	
NO. 25 COPPER	0.352	124.0	275.1	-0.009	-5297	1152539	0.563	-101265	294426	193161	16.56	
NO. 26 MOTOR VEHICLE	0.327	136.3	302.6	-0.048	-36135	1357910	0.564	-111133	324003	212870	29.55	
TOTAL -- ALL		4024	7812		1605754	37366720		-2607826	8368053	5780225		
FUEL SAVINGS CASES ONLY		4024	7812		1605754	37366720		-2607826	8368053	5780225		
COST SAVINGS CASES ONLY		2762	4928		2575143	20862912		-1510108	5312335	3802229		
EMISSIONS SAVINGS CASE ONLY		0	0		0	0		0	0	0		
FUEL & COST SAVINGS CASES		2762	4928		2575143	20862912		-1510108	5312335	3802229		
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0	0	0		

YEAR : 1990
 NO.23 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, PETROLEUM B.G.
 NATIONAL SURFARY
 *** STRATEGY OPTIMUM
 07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
TOTAL -- ALL	12559	26247	114277344	114277344	114277344	114277344	114277344	114277344	114277344	114277344
FUEL SAVINGS CASES ONLY	12559	26249	114277344	114277344	114277344	114277344	114277344	114277344	114277344	114277344
COST SAVINGS CASES ONLY	7865	15218	7359334	7359334	7359334	7359334	7359334	7359334	7359334	7359334
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	7865	15218	7359334	7359334	7359334	7359334	7359334	7359334	7359334	7359334
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		COAL DERIVED		TOTAL FUEL	
	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM	NATURAL PETROLEUM	PETROLEUM
TOTAL -- ALL	14654	-425	-28901	0	25034	2197
FUEL SAVINGS CASES ONLY	14654	-425	-28901	0	25034	2197
COST SAVINGS CASES ONLY	6234	0	-14047	0	13590	2089
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	6234	0	-14047	0	13590	2089
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	-28901	0	25034	2197	12559
FUEL SAVINGS CASES ONLY	14654	-425	-28901	0	25034	2197	12559
COST SAVINGS CASES ONLY	6234	0	-14047	0	13590	2089	7865
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	6234	0	-14047	0	13590	2089	7865
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	-28901	0	25034	2197	12559
FUEL SAVINGS CASES ONLY	14654	-425	-28901	0	25034	2197	12559
COST SAVINGS CASES ONLY	6234	0	-14047	0	13590	2089	7865
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	6234	0	-14047	0	13590	2089	7865
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

INDUSTRY	CTAS GENERAL SUMMARY - PROCESS LEVEL				NO. 24 ADVANCED TECHNOLOGY, COB. CYCLE, DIRECT FIRED, COAL DER. B.G.				*** STRATEGY OPTIMUM				EMISSIONS SAVINGS				01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	TOTAL SAVINGS	UTILITY SAVINGS	COST RATIO	DOLLARS \$000	SAVINGS RATIO	DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	EMISSIONS SAVINGS	PLANT UTILITY	SAVINGS RATIO	EMISSIONS SAVINGS	PLANT UTILITY	SAVINGS RATIO	
NO. 01 MEAT PACKING	0.345	84.8	84.8	188.7	-0.216	-84047			1467711	0.527	-75833	201865		126032	16.81		
NO. 02 BAKING	0.287	40.1	40.1	115.3	-1.382	-197365			1579563	0.532	-54334	123391		69050	0.99*		
NO. 03 MALT BEVERAGE	0.347	79.8	79.8	177.7	-0.242	-63683			836839	0.527	-71232	190183		118871	9.80*		
NO. 04 WOVEN FABRIC MILL	0.342	44.0	44.0	99.0	0.025	9895			977814	0.527	-39977	105948		65970	2.25*		
NO. 05 SAW MILL	0.403	45.3	45.3	91.7	-0.274	-140203			3682220	0.571	-33810	98163		64353	0.20*		
NO. 06 NEWSPRINT MILL	0.350	46.0	46.0	102.9	0.223	97297			318814	0.528	-40649	100322		67673	74.15		
NO. 07 WITTING PAPER MILL	0.350	84.2	84.2	188.4	0.047	23191			742869	0.528	-88922	236950		148050	54.82		
NO. 08 CORRUGATED PAPER	0.350	484.1	484.1	1083.6	-0.020	-39204			3842255	0.528	-433559	1152785		7192271	14.76		
NO. 09 BOX BOARD	0.349	133.0	133.0	298.6	0.018	10625			865100	0.527	-119326	316651		1973251	100.47		
NO. 10 CHLORINE	0.389	260.4	260.4	493.1	0.272	674450			1766361	0.558	-177428	540818		363390	44.88		
NO. 11 ALUMINA	0.287	103.8	103.8	281.9	-0.284	-125662			774850	0.486	-129261	301809		1725481	32.71		
NO. 12 LOW DENS. POLYETHYL	0.339	59.7	59.7	150.3	0.186	119066			630284	0.532	-85693	168849		95156	17.55		
NO. 13 HI DENS. POLYETHYL	0.352	36.3	36.3	80.6	0.144	40570			353460	0.528	-32327	86327		54000	13.24		
NO. 14 POLYVINYL CHLORIDE	0.352	86.4	86.4	147.3	0.089	37664			650587	0.528	-58903	157508		98525	12.64		
NO. 15 STYRENE-BUT. RUB.	0.330	17.8	17.8	39.2	-0.194	-14055			188071	0.504	-15782	42050		26276	14.12		
NO. 16 NYLON	0.351	13.1	13.1	29.1	0.110	11685			178695	0.528	-11647	31227		19580	5.44*		
NO. 17 STYRENE	0.084	19.2	19.2	47.7	-0.090	-61095			309489	0.180	-23119	51051		27932	20.79		
NO. 18 ETHYLENE	0.033	41.5	41.5	90.3	-0.047	-192345			1222905	0.043	-55092	92765		37672	15.19		
NO. 19 PETROLEUM REFINING	0.271	1758.5	1758.5	2695.9	0.070	1036592			9777875	0.386	-742903	2885678		2162776	112.09		
NO. 20 TIRES	0.352	85.6	85.6	190.0	-0.028	-11315			689560	0.528	-75947	203305		127358	20.64		
NO. 23 INTEGRATED STEEL	0.046	207.7	207.7	487.4	0.050	531504			4039773	0.067	-193892	521814		327922	99.18		
NO. 24 GRAY IRON FOUNDRY	0.308	73.8	73.8	160.8	0.069	38630			584941	0.471	-64504	171984		187480	31.91		
NO. 25 COPPER	0.352	124.0	124.0	275.1	-0.009	-5287			1152539	0.528	-110588	294426		183837	16.56		
NO. 26 MOTOR VEHICLE	0.327	136.3	136.3	302.6	-0.048	-36135			1357910	0.528	-121359	324083		202644	29.55		
TOTAL -- ALL		4045	4045	7823		1661771			37390480		-2836160	839820		5583657			
FUEL SAVINGS CASES ONLY		4045	4045	7823		1661771			37390480		-2836160	839820		5583657			
COST SAVINGS CASES ONLY		2783	2783	4939		2631168			20886656		-1636251	5324103		3687854			
EMISSIONS SAVINGS CASE ONLY		0	0	0		0			0		0	0		0			
FUEL & COST SAVINGS CASES		2783	2783	4939		2631168			20886656		-1636251	5324103		3687854			
FUEL, COST & EMISSIONS SAVING		0	0	0		0			0		0	0		0			

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 2 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, COAL DER. B.G.

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	12600	26270			3269936		114322944		-10374836	10104940
FUEL SAVINGS CASES ONLY	12600	26270			3269936		114322944		-10374836	10104940
COST SAVINGS CASES ONLY	7905	15239			7466724		61415248		-5623682	10107849
EMISSIONS SAVINGS CASE ONLY	0	0			0		0		0	0
FUEL & COST SAVINGS CASES	7905	15239			7466724		61415248		-5623682	10107849
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	OTHER	FUEL
TOTAL -- ALL	14654	-425	6082	0	-34964	12600
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-34964	12600
COST SAVINGS CASES ONLY	6234	0	3159	0	-17187	7905
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	6234	0	3159	0	-17187	7905
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-34964	12600
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-34964	12600
COST SAVINGS CASES ONLY	6234	0	3159	0	-17187	7905
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	6234	0	3159	0	-17187	7905
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	4123	6320
FUEL SAVINGS CASES ONLY	0	0	0	0	4123	6320
COST SAVINGS CASES ONLY	0	0	0	0	2476	4565
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	2476	4565
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL															
NO.25 ADVANCED TECHNOLOGY, COMBINED		CYCLE, DIRECT FIRED, COAL (PFB)			FUEL SAVINGS			FUEL SAVINGS			EMISSIONS			ECS	
INDUSTRY	FUEL SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST DOLLARS \$000	SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	SAVINGS PER YEAR	TOTAL	EMISSIONS SAVINGS RATIO	PLANT UTILITY	SAVINGS PER YEAR	TOTAL	ECS SIZE (MM)
NO.01 MEAT PACKING	0.235	45.3	135.7	-0.318	-123910	3003786	0.449	-63276	145121	81845	12.16				
NO.02 BAKING	0.164	7.8	23.7	-0.476	-67961	971707	0.449	-11066	25359	14293	0.20*				
NO.03 MALT BEVERAGE	0.218	41.9	140.2	-0.308	-81168	2072352	0.439	-68656	150003	81347	7.85*				
NO.04 WOVEN FABRIC MILL	0.194	20.9	77.8	-0.102	-40542	2020199	0.425	-39713	83275	43561	1.97*				
NO.05 SAW MILL	0.184	20.7	8.8	-0.201	-102992	2569361	0.158	8343	9455	17799	0.01*				
NO.06 NEWSPRINT MILL	0.280	33.6	91.4	0.281	122615	87979	0.487	-39667	96292	56624	69.76				
NO.07 WRITING PAPER MILL	0.245	45.4	133.3	0.180	87979	1548819	0.453	-71861	167617	95755	38.97				
NO.08 CORRUGATED PAPER	0.244	259.5	764.7	0.160	299512	6722459	0.452	-350402	813508	463106	108.55				
NO.09 BOX BOARD	0.244	71.3	209.3	0.181	104168	1873252	0.453	-95379	221977	126598	106.16*				
NO.10 CHLORINE	0.280	187.0	499.1	0.278	690988	4814805	0.483	-221456	540818	319362	45.16				
NO.11 ALUMINA	0.139	31.7	149.2	-0.070	-31120	1384659	0.363	-82532	159757	77225	70.40				
NO.12 LOW DENS. POLYETHYL	0.122	21.3	81.3	0.099	63073	1033241	0.254	-42018	87019	45002	9.52*				
NO.13 HI DENS. POLYETHYL	0.195	17.7	68.3	0.128	35865	837292	0.423	-35512	73222	37710	11.31				
NO.14 POLYVINYL CHLORIDE	0.195	33.8	132.1	0.050	21303	1609361	0.426	-68724	141248	72523	11.42				
NO.15 STYRENE-BUT. RUB.	0.207	9.5	31.2	-0.167	-12093	403095	0.417	-15313	33423	18109	11.29				
NO.16 NYLON	0.214	6.2	20.7	0.188	13660	333526	0.430	-10123	28168	12045	3.88*				
NO.17 STYRENE	0.060	13.8	47.7	0.207	140803	686619	0.161	-26028	51039	25011	20.84				
NO.18 ETHYLENE	0.025	31.8	97.9	0.351	1422064	2249372	0.040	-64922	100524	35432	15.22				
NO.19 PETROLEUM REFINING	0.254	1648.9	2699.3	0.365	5379970	27598016	0.382	-767142	2889351	2122289	112.66				
NO.20 TIRES	0.195	43.9	171.3	-0.142	-57381	2337675	0.427	-89023	183318	94295	18.74				
NO.23 INTEGRATED STEEL	0.028	128.1	487.4	0.027	284997	7362097	0.057	-244447	521814	277367	99.83				
NO.24 GRAY IRON FOUNDRY	0.123	19.0	34.0	0.239	133408	551393	0.180	-11983	36327	24369	6.78*				
NO.25 COPPER	0.195	63.4	247.5	-0.062	-36466	2940710	0.425	-129194	264805	135611	15.00				
NO.26 MOTOR VEHICLE	0.180	69.7	272.3	-0.149	-112518	3679113	0.426	-141905	291553	149648	26.78				
TOTAL -- ALL															4427006
FUEL SAVINGS CASES ONLY															7105986
COST SAVINGS CASES ONLY															4427006
EMISSIONS SAVINGS CASE ONLY															3713278
FUEL & COST SAVINGS CASES															17759
FUEL, COST & EMISSIONS SAVING															3713278

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

07

CATEGORY	NO.25 ADVANCED TECHNOLOGY,COMBINED CYCLE,DIRECT FIRED,COAL(PFB)				*** STRATEGY OPTIMUM			
	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS			
					PLANT	UTILITY	TOTAL	
TOTAL -- ALL	8048	20809	27465424	241717360	-9261928	22575840	13313900	
FUEL SAVINGS CASES ONLY	8048	20809	27465424	241717360	-9261928	22575840	13313900	
COST SAVINGS CASES ONLY	7053	16969	29066720	186759984	-7267567	18465264	1197697	
EMISSIONS SAVINGS CASE ONLY	40	17	-197415	4924977	15992	18124	3411	
FUEL & COST SAVINGS CASES	7053	16969	29066720	186759984	-7267567	18465264	1119769	
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU				TOTAL FUEL	
	NATURAL GAS	PETROLEUM DISTILLATE	BOILER FUEL	COAL DERIVED	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	6082	0	-14460	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-14460	2197
COST SAVINGS CASES ONLY	13769	0	5539	0	-14371	2116
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	3	13
FUEL & COST SAVINGS CASES	13769	0	5539	0	-14371	2116
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-14460	2197	8048
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-14460	2197	8048
COST SAVINGS CASES ONLY	13769	0	5539	0	-14371	2116	7053
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	3	13	40
FUEL & COST SAVINGS CASES	13769	0	5539	0	-14371	2116	7053
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	-14460	2197	8048
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-14460	2197	8048
COST SAVINGS CASES ONLY	13769	0	5539	0	-14371	2116	7053
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	3	13	40
FUEL & COST SAVINGS CASES	13769	0	5539	0	-14371	2116	7053
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL																	
NO. 26 ADVANCED TECHNOLOGY, COMBINED CYCLE, INDIRECT FIRED, COAL (AFB)																	
INDUSTRY	FUEL SAVINGS			UTILITY			COST			SAVINGS			EMISSIONS			01	
	RATIO	SAVINGS	FUEL	SAVINGS	RATIO	DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR	SAVINGS TOTAL	EMISSIONS TOTAL	SAVINGS TOTAL	EMISSIONS TOTAL	SAVINGS TOTAL	EMISSIONS TOTAL	
NO. 01 MEAT PACKING	0.207	27.1	74.0	-0.106	-41358	2153892	0.355	-37761	79107	41346	6.87*						
NO. 02 BAKING	0.096	3.8	15.1	-0.310	-44283	691615	0.314	-8073	16176	7303	0.14*						
NO. 03 MALT BEVERAGE	0.128	18.1	89.6	-0.237	-62428	1658018	0.305	-55843	95831	39988	5.21*						
NO. 04 MOVEN FABRIC MILL	0.092	9.9	49.6	-0.096	-37890	1510871	0.216	-30988	53089	22101	1.18*						
NO. 05 SAW MILL	0.165	18.5	8.1	-0.210	-107634	2578610	0.138	6813	8699	15512	0.01*						
NO. 06 NEWSPRINT MILL	0.235	28.2	82.0	0.242	105558	833152	0.391	-40839	86302	45463	61.55						
NO. 07 WRITING PAPER MILL	0.167	23.0	85.5	0.193	94346	1226041	0.330	-57684	107567	49882	25.89						
NO. 08 CORRUGATED PAPER	0.181	139.2	470.1	0.208	389879	4829370	0.338	-260041	500084	240043	103.56						
NO. 09 BOX BOARD	0.191	39.7	125.2	0.230	132271	1364735	0.344	-67191	132786	65595	65.68						
NO. 10 CHLORINE	0.147	98.2	342.9	0.181	450185	3850933	0.268	-194412	371568	177156	30.56						
NO. 11 ALUMINA	0.059	9.8	86.7	-0.003	-1137	948091	0.226	-59806	92781	32975	42.26						
NO. 12 LOW DENS. POLYETHYL	0.053	9.3	47.2	0.048	30589	783144	0.118	-29659	50510	20851	5.72*						
NO. 13 HI DENS. POLYETHYL	0.106	8.1	39.1	0.109	30543	623899	0.238	-24361	41879	17518	6.70*						
NO. 14 POLYVINYL CHLORIDE	0.133	15.3	73.7	0.137	57808	1167746	0.307	-45710	78782	33071	6.92*						
NO. 15 STYRENE-BUT. RUB.	0.122	4.2	19.9	-0.130	-9432	329698	0.284	-12468	21390	8922	7.49*						
NO. 16 NYLON	0.102	3.0	15.0	0.056	5999	290276	0.239	-9431	16133	6702	2.93*						
NO. 17 STYRENE	0.045	10.3	46.2	0.194	131725	735832	0.125	-30254	49431	19177	20.94						
NO. 18 ETHYLENE	0.055	68.9	94.4	0.369	1498249	2330438	0.062	-42744	96949	54205	15.18						
NO. 19 PETROLEUM REFINING	0.226	1440.6	2586.6	0.334	4925781	29463920	0.326	-997128	2768695	1771568	111.94						
NO. 20 TIRES	0.132	19.8	96.0	0.017	6914	1591322	0.307	-59538	102738	43200	10.87						
NO. 23 INTEGRATED STEEL	0.016	73.0	398.2	0.014	151620	6793785	0.039	-236096	426326	190230	67.62						
NO. 24 GRAY IRON FOUNDRY	0.073	11.3	25.5	0.206	114929	498738	0.104	-13139	27240	14101	5.29*						
NO. 25 COPPER	0.132	28.6	138.6	0.057	33326	2072836	0.305	-86554	148295	61741	8.70*						
NO. 26 MOTOR VEHICLE	0.118	31.6	153.0	-0.034	-25532	2646088	0.307	-95308	163859	68551	15.58						

TOTAL -- ALL		2140	5162		7830023	70979952		-2489011	5536210	3047200							
FUEL SAVINGS CASES ONLY		2140	5162		7830023	70979952		-2439011	5536210	3047200							
COST SAVINGS CASES ONLY		2017	4666		8159715	50461136		-2194779	5005280	2810502							
EMISSIONS SAVINGS CASE ONLY		19	8		-107634	2578610		6813	8699	15512							
FUEL & COST SAVINGS CASES		2017	4666		8159715	58461136		-2194779	5005280	2810502							
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0							

YEAR : 1990
 NO.26 ADVANCED TECHNOLOGY, COMBINED CYCLE, INDIRECT FIRED, COAL (AFB)
 NATIONAL SUMMARY
 *** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	5785	15396			27601409	27601409	209184336	-7986062	16659357	8673281
FUEL SAVINGS CASES ONLY	5785	15396			27601408	27601408	209184336	-7986062	16659357	8673281
COST SAVINGS CASES ONLY	5454	13655			28270896	28270896	176205968	-6880145	14794866	7914711
EMISSIONS SAVINGS CASE ONLY	35	16			-206314	-206314	4942706	13060	16674	29733
FUEL & COST SAVINGS CASES	5454	13655			28270896	28270896	176205968	-6880145	14794866	7914711
FUEL, COST & EMISSION SAVING	0	0			0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	DISTILLATE	PETROLEUM	GAS	DISTILLATE	COAL	OTHER
TOTAL -- ALL	14654	-425	6082	0	0	0	-16723	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	0	-16723	2197
COST SAVINGS CASES ONLY	13973	0	5580	0	0	0	-16217	2118
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	0	-1	13
FUEL & COST SAVINGS CASES	13973	0	5580	0	0	0	-16217	2118
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	0	-16723	2197	5785
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	0	-16723	2197	5785
COST SAVINGS CASES ONLY	13973	0	5580	0	0	0	-16217	2118	5454
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	0	-1	13	35
FUEL & COST SAVINGS CASES	13973	0	5580	0	0	0	-16217	2118	5454
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	0	-16723	2197	5785
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	0	-16723	2197	5785
COST SAVINGS CASES ONLY	13973	0	5580	0	0	0	-16217	2118	5454
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	0	-1	13	35
FUEL & COST SAVINGS CASES	13973	0	5580	0	0	0	-16217	2118	5454
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 27 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP., PETROLEUM DISTILLATE									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST SAVINGS		DOLLARS		4** STRATEGY OPTIMUM		01
	SAVINGS	FUEL	SAVINGS	RATIO	\$000	\$000	CAPITAL COST \$000	EMISSIONS RATIO	EMISSIONS SAVINGS
	RATIO	SAVINGS	FUEL	RATIO	\$000	\$000	CAPITAL COST \$000	EMISSIONS RATIO	EMISSIONS SAVINGS
NO. 01 MEAT PACKING	0.372	52.1	82.9	-0.027	-10524	753084	0.930	24995	88675
NO. 02 BAKING	0.201	17.1	60.9	-0.783	-111836	393080	0.994	5403	65189
NO. 03 MALT BEVERAGE	0.189	44.3	182.4	-1.272	-335150	685019	0.910	11366	195149
NO. 04 WOVEN FABRIC MILL	0.139	15.0	77.8	-0.178	-70700	531319	0.851	2248	83274
NO. 05 SAW MILL	0.292	32.8	91.7	-0.059	-30249	1515035	0.994	12350	98163
NO. 06 NEWSPRINT MILL	0.230	27.6	91.4	-0.082	-35625	480632	0.965	13922	96292
NO. 07 WRITING PAPER MILL	0.222	98.4	391.6	-1.571	-768925	1999409	0.987	32129	492472
NO. 08 CORRUGATED PAPER	0.225	502.3	1931.4	-1.738	-3262821	8186950	0.980	143243	2054664
NO. 09 BOX BOARD	0.242	37.6	72.5	-0.067	-38695	742878	0.993	50823	76864
NO. 10 CHLORINE	0.237	158.3	499.1	-0.054	-135062	2478244	0.921	57010	540819
NO. 11 ALUMINA	0.081	13.6	90.2	-0.362	-160417	434126	0.654	-479	96614
NO. 12 LOW DENS. POLYETHYL	0.151	26.4	148.6	-0.180	-114899	731404	0.925	3187	159056
NO. 13 HI DENS. POLYETHYL	0.145	11.1	53.7	-0.135	-37870	286301	0.827	1875	57565
NO. 14 POLYVINYL CHLORIDE	0.148	17.1	73.7	-0.110	-46317	410389	0.785	3592	78782
NO. 15 STYRENE-BUT. RUB.	0.179	9.7	39.3	-1.019	-73701	208203	0.866	2391	42145
NO. 16 NYLON	0.165	4.8	20.7	-0.114	-12143	108138	0.849	1099	22168
NO. 17 STYRENE	0.057	12.9	48.1	-0.180	-121841	343187	0.366	1639	51467
NO. 18 ETHYLENE	0.039	49.8	103.8	-0.048	-194726	807577	0.137	4053	106611
NO. 19 PETROLEUM REFINING	0.079	409.0	1379.5	-0.160	-2361478	7379591	0.401	78521	1476619
NO. 20 TIRES	0.150	20.4	82.3	-0.221	-89351	519633	0.762	4892	88040
NO. 23 INTEGRATED STEEL	0.020	89.2	487.4	-0.029	-311435	4973788	0.107	-3103	521814
NO. 24 GRAY IRON FOUNDRY	0.083	12.9	74.2	-0.129	-72049	410903	0.611	0	79390
NO. 25 COPPER	0.150	29.5	119.2	-0.205	-120476	640472	0.762	6571	127519
NO. 26 MOTOR VEHICLE	0.132	32.4	130.8	-0.226	-171241	877134	0.762	7507	140043
TOTAL -- ALL		1724	6333		-8687423	36096352		465232	6839385
FUEL SAVINGS CASES ONLY		1724	6333		-8687423	36096352		465232	6839385
COST SAVINGS CASES ONLY		0	0		0	0		0	0
EMISSIONS SAVINGS CASE ONLY		1621	5750		-8215573	30688464		468815	6220958
FUEL & COST SAVINGS CASES		0	0		0	0		0	0
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0

YEAR : 1990
 10.27 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP., PETROLEUM DISTILLATE
 NATIONAL SUMMARY
 - COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY
 *** STRATEGY OPTIMUM

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CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
TOTAL -- ALL	6778	25331	6778	25331	-37767360	135447216	1985403	28106992	30092416	30092416		
FUEL SAVINGS CASES ONLY	6778	25331	6778	25331	-37767360	135447216	1985403	28106992	30092416	30092416		
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0		
EMISSIONS SAVINGS CASE ONLY	6466	23462	6466	23462	-35508304	121415392	1996316	26105760	28102080	28102080		
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0		
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0		

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
TOTAL -- ALL	14654	-22753	14654	-22753	2197	6778
FUEL SAVINGS CASES ONLY	14654	-22753	14654	-22753	2197	6778
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	12765	-20792	12765	-20792	1545	6466
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
TOTAL -- ALL	14654	-22753	14654	-22753	2197	6778
FUEL SAVINGS CASES ONLY	14654	-22753	14654	-22753	2197	6778
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	12765	-20792	12765	-20792	1545	6466
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL	
TOTAL -- ALL	14654	-22753	14654	-22753	2197	6778
FUEL SAVINGS CASES ONLY	14654	-22753	14654	-22753	2197	6778
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	12765	-20792	12765	-20792	1545	6466
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL													*** STRATEGY OPTIMUM			EMISSIONS SAVINGS			ECS	
NO.28 ADVANCED TECHNOLOGY,FUEL CELL,LOW TEMP.,COAL DERIVED DIST													CAPITAL COST \$000	SAVINGS RATIO	EMISSIONS RATIO	PLANT	UTILITY	TOTAL	SIZE (MM)	
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO								SAVINGS RATIO
NO.01 MEAT PACKING	0.404	56.4	82.9	-0.073	-28434					975802	0.796	0.796	11580	88685	100265	7.31				
NO.02 BAKING	0.246	9.0	15.7	-0.062	-8879					159274	0.791	0.791	1625	16786	18411	0.16*				
NO.03 MALT BEVERAGE	0.379	53.3	88.7	-0.218	-57449					571986	0.788	0.788	7692	94836	102528	4.88				
NO.04 HOVEN FABRIC MILL	0.165	17.8	77.8	-0.300	-119102					909204	0.725	0.725	-8956	83274	74319	2.19				
NO.05 SAW MILL	0.291	32.6	91.7	-0.128	-65289					1792019	0.771	0.771	-11270	98163	86893	0.20*				
NO.06 NEWSPRINT MILL	0.267	32.0	91.4	-0.076	-32948					551096	0.759	0.759	-8057	96292	88234	68.92				
NO.07 KRAFTING PAPER MILL	0.404	56.1	86.5	0.062	30262					643933	0.794	0.794	12134	108827	120960	24.85				
NO.08 CORRUGATED PAPER	0.412	321.6	480.5	0.003	5569					2862392	0.796	0.796	63137	511169	574306	66.94				
NO.09 BOX BOARD	0.411	88.3	132.6	0.041	23470					806712	0.795	0.795	17108	140565	157674	66.00				
NO.10 CHLORINE	0.250	167.0	499.1	-0.110	-273649					3336273	0.752	0.752	-43766	540818	497052	46.47				
NO.11 ALUMINA	0.098	37.8	306.6	-1.725	-763480					1717902	0.659	0.659	-76899	328271	251372	95.68				
NO.12 LOW DENS. POLYETHYL	0.151	26.4	148.6	-0.232	-148558					968164	0.688	0.688	-37118	159056	121938	18.19				
NO.13 HI DENS. POLYETHYL	0.142	13.3	70.9	-0.332	-93353					460832	0.637	0.637	-17474	76004	58530	11.65				
NO.14 POLYVINYL CHLORIDE	0.142	24.3	130.0	-0.490	-207021					844215	0.637	0.637	-31963	138974	107011	11.14				
NO.15 STYRENE-BUT. RUB.	0.238	5.7	9.1	-0.050	-3643					74313	0.526	0.526	672	9733	10405	3.23				
NO.16 NYLON	0.155	4.5	20.7	-0.183	-19460					140797	0.654	0.654	-3855	22168	18312	3.85				
NO.17 STYRENE	0.132	30.1	48.3	-0.105	-71098					397836	0.350	0.350	2791	51704	54495	20.85				
NO.18 ETHYLENE	0.066	83.0	104.1	-0.026	-105550					937752	0.124	0.124	3298	106914	110213	15.19				
NO.19 PETROLEUM REFINING	0.089	575.3	2679.3	-0.412	-6071728					17570368	0.399	0.399	-657052	2867927	2210876	82.51				
NO.20 TIRES	0.150	16.4	55.8	-0.125	-50545					539916	0.532	0.532	-7990	59693	51802	6.90				
NO.23 INTEGRATED STEEL	0.019	85.0	497.4	-0.041	-441940					5781080	0.081	0.081	-126624	521814	395191	98.90				
NO.24 GRAY IRON FOUNDRY	0.083	12.9	74.2	-0.162	-90367					543963	0.435	0.435	-20362	79390	59029	17.21				
NO.25 COPPER	0.176	28.2	82.6	-0.231	-136001					1086825	0.701	0.701	11440	88446	99886	8.73				
NO.26 MOTOR VEHICLE	0.143	29.9	93.8	-0.284	-215397					1513610	0.699	0.699	11588	100465	112053	16.54				
TOTAL -- ALL													-----			-----			-----	
FUEL SAVINGS CASES ONLY													-----			-----			-----	
COST SAVINGS CASES ONLY													-----			-----			-----	
EMISSIONS SAVINGS CASE ONLY													-----			-----			-----	
FUEL & COST SAVINGS CASES													-----			-----			-----	
FUEL,COST & EMISSIONS SAVING													-----			-----			-----	

YEAR : 1990
 NO.26 ADVANCED TECHNOLOGY,FUEL CELL,LOW TEMP,COAL DERIVED DIST
 NATIONAL SUMMARY
 *** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS		TOTAL UTILITY		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	FUEL	SAVINGS	DOLLARS \$000	\$000	\$000	\$000	PLANT	TONS PER YEAR
ALL	6597	19600			-25775440		138985424		-2426285	21160192
FUEL SAVINGS CASES ONLY	6597	19600			-25775440		138985424		-2426285	21160192
COST SAVINGS CASES ONLY	2509	3791			568353		24563840		508257	4280699
EMISSIONS SAVINGS CASE ONLY	3596	5471			-1333753		41500688		629900	6044951
FUEL & COST SAVINGS CASES	2509	3791			568353		24563840		508257	4280699
FUEL,COST & EMISSION SAVING	2509	3791			568353		24563840		508257	4280699
										4788957

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	PETROLEUM	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL
ALL	14654	-425	6082		0	-18355	-15942	18385
FUEL SAVINGS CASES ONLY	14654	-425	6082		0	-18355	-15942	18385
COST SAVINGS CASES ONLY	965	0	853		0	-3624	0	4316
EMISSIONS SAVINGS CASE ONLY	8305	-17	2934		0	-5471	-8381	6133
FUEL & COST SAVINGS CASES	965	0	853		0	-3624	0	4316
FUEL,COST & EMISSION SAVING	965	0	853		0	-3624	0	4316

SITE PLUS UTILITY

ALL	14654	-425	6082		0	-18355	-15942	18385	2197	6597
FUEL SAVINGS CASES ONLY	14654	-425	6082		0	-18355	-15942	18385	2197	6597
COST SAVINGS CASES ONLY	965	0	853		0	-3624	0	4316	0	2509
EMISSIONS SAVINGS CASE ONLY	8305	-17	2934		0	-5471	-8381	6133	93	3596
FUEL & COST SAVINGS CASES	965	0	853		0	-3624	0	4316	0	2509
FUEL,COST & EMISSION SAVING	965	0	853		0	-3624	0	4316	0	2509
INCLUDING COAL FUEL CONVERSION										
ALL	0	0	0		0	0	0	-1594	2197	603
FUEL SAVINGS CASES ONLY	0	0	0		0	0	0	-1594	2197	603
COST SAVINGS CASES ONLY	0	0	0		0	0	0	1734	0	1734
EMISSIONS SAVINGS CASE ONLY	0	0	0		0	0	0	2375	93	2469
FUEL & COST SAVINGS CASES	0	0	0		0	0	0	1734	0	1734
FUEL,COST & EMISSION SAVING	0	0	0		0	0	0	1734	0	1734

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL																		
INDUSTRY	NO.29 ADVANCED TECHNOLOGY-FUEL CELL/HIGH TEMP./PETROLEUM DIST.										*** STRATEGY OPTIMUM		EMISSIONS SAVINGS			01 ECS SIZE (MM)		
	FUEL ENERGY TOTAL					SAVINGS DOLLARS \$000					CAPITAL COST \$000	SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR	TOTAL			
	SAVINGS RATIO	FUEL SAVINGS	UTILITY FUEL	COST RATIO	SAVINGS \$000	SAVINGS \$000	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO		
NO.01 HEAT PACKING	0.430	73.3	113.5	-0.093	-36320	1154668	0.789	896	121367	122262	10.04							
NO.02 BAKING	0.310	49.4	135.1	-1.511	-215747	956339	0.813	-22310	144535	122226	1.15							
NO.03 MALT BEVERAGE	0.255	66.9	182.5	-0.949	-249878	1022035	0.725	-30592	195166	164573	10.12							
NO.04 WOVEN FABRIC MILL	0.332	177.4	504.6	-1.796	-712147	3120119	0.811	-87845	540005	452160	11.49							
NO.05 SAW MILL	0.428	48.0	91.7	0.037	18895	1659045	0.829	-6076	98163	92087	0.20*							
NO.06 NEWSPRINT MILL	0.351	42.1	91.4	0.021	9049	590757	0.800	-4948	96292	91344	83.20							
NO.07 WRITING PAPER MILL	0.340	210.8	567.5	-1.727	-845257	3242658	0.805	-107071	713800	605929	82.51							
NO.08 CORRUGATED PAPER	0.332	740.5	1931.3	-1.247	-2340875	9359499	0.783	-297913	2054571	1756658	90.80							
NO.09 BOX BOARD	0.340	262.4	669.5	-1.451	-834479	3287305	0.798	-106496	730080	623584	99.18							
NO.10 CHLORINE	0.355	237.6	499.1	0.048	120072	3090034	0.774	-38597	540819	582221	48.79							
NO.11 ALUMINA	0.269	103.4	305.3	-0.955	-422804	1469500	0.717	-56467	326844	270378	95.36							
NO.12 LOW DENS. POLYETHYL	0.339	150.4	418.6	-0.631	-403120	2064895	0.812	-70982	448155	377173	48.67							
NO.13 HI DENS. POLYETHYL	0.334	147.4	419.2	-1.963	-551304	2031561	0.811	-73131	449130	375999	68.83							
NO.14 POLYVINYL CHLORIDE	0.333	254.5	722.8	-2.311	-977277	3521043	0.810	-125624	772941	647317	61.99							
NO.15 STYRENE-BUT. RUB.	0.289	14.4	38.9	-0.760	-54970	238025	0.689	-6599	41748	35149	14.00							
NO.16 NYLON	0.337	47.3	132.4	-1.584	-168892	675300	0.811	-22582	141978	119396	24.71							
NO.17 STYRENE	0.083	18.9	48.2	-0.146	-99131	376520	0.290	-9418	51510	42092	20.90							
NO.18 ETHYLENE	0.050	62.7	103.3	-0.036	-146039	878124	0.108	-19344	106095	86751	15.17							
NO.19 PETROLEUM REFINING	0.165	1078.2	2726.5	-0.250	-3680111	15278874	0.463	-457435	2918408	2460973	83.91							
NO.20 TIRES	0.307	195.0	541.9	-1.898	-768855	3182458	0.795	-91844	579903	488059	58.82							
NO.23 INTEGRATED STEEL	0.037	166.1	492.9	0.001	13038	4815012	0.089	-93822	527759	433936	80.17							
NO.24 GRAY IRON FOUNDRY	0.164	25.4	74.2	-0.045	-25185	469677	0.496	-14980	79390	64411	17.21							
NO.25 COPPER	0.328	288.8	803.7	-1.828	-1074903	4005725	0.796	-136932	860037	723105	48.33							
NO.26 MOTOR VEHICLE	0.319	330.0	920.2	-1.816	-1376160	5730184	0.797	-156948	985428	828480	89.81							

TOTAL -- ALL		4791	12553		-14822392	72219200		-2037857	13524116	11486257								
FUEL SAVINGS CASES ONLY		4791	12553		-14822392	72219200		-2037857	13524116	11486257								
COST SAVINGS CASES ONLY		494	1175		161055	10154848		-143443	1263032	1119569								
EMISSIONS SAVINGS CASE ONLY		73	113		-36320	1154668		896	121367	122262								
FUEL & COST SAVINGS CASES		494	1175		161055	10154848		-143443	1263032	1119569								
FUEL,COST & EMISSIONS SAVING		0	0		0	0		0	0	0								

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.29 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP., PETROLEUM DIST.

*** STRATEGY OPTIMUM

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	UTILITY
TOTAL -- ALL	17825	46929			-57199024	260438592			-7763149	51689248
FUEL SAVINGS CASES ONLY	17825	46929			-57199024	260438592			-7763149	51689248
COST SAVINGS CASES ONLY	1570	3602			465806	28139488			-351840	3847291
EMISSIONS SAVINGS CASE ONLY	141	217			-69618	2213279			1717	232637
FUEL & COST SAVINGS CASES	1570	3602			465906	28139488			-351840	3847291
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-33611	-11129	0	45714	2197
FUEL SAVINGS CASES ONLY	14654	-33611	-11129	0	45714	2197
COST SAVINGS CASES ONLY	1761	-2746	693	0	1198	664
EMISSIONS SAVINGS CASE ONLY	61	-152	-12	0	240	4
FUEL & COST SAVINGS CASES	1761	-2746	693	0	1198	664
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-33611	-11129	0	45714	2197	17825
FUEL SAVINGS CASES ONLY	14654	-33611	-11129	0	45714	2197	17825
COST SAVINGS CASES ONLY	1761	-2746	693	0	1198	664	1570
EMISSIONS SAVINGS CASE ONLY	61	-152	-12	0	240	4	141
FUEL & COST SAVINGS CASES	1761	-2746	693	0	1198	664	1570
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-33611	-11129	0	45714	2197	17825
FUEL SAVINGS CASES ONLY	14654	-33611	-11129	0	45714	2197	17825
COST SAVINGS CASES ONLY	1761	-2746	693	0	1198	664	1570
EMISSIONS SAVINGS CASE ONLY	61	-152	-12	0	240	4	141
FUEL & COST SAVINGS CASES	1761	-2746	693	0	1198	664	1570
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY OPTIMUM				EMISSIONS SAVINGS		01	
NO. 30 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP. COAL DER. DIST.										CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	TOTAL	TONS PER YEAR	TOTAL	ECS SIZE (MM)
INDUSTRY	FUEL SAVINGS RATIO	ENERGY TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST DER. DIST. SAVINGS \$000	SAVINGS RATIO	SAVINGS \$000	SAVINGS RATIO	SAVINGS \$000	SAVINGS RATIO								
NO. 01 MEAT PACKING	0.419	64.4	96.5	-0.023	-8005	840160	0.790	7811	103276	111007	8.52						
NO. 02 BAKING	0.287	51.5	155.4	-1.749	-249019	963712	0.765	-34029	166236	132207	1.33						
NO. 03 MALT BEVERAGE	0.399	62.4	108.3	-0.211	-55590	518662	0.781	2167	115814	117981	5.97						
NO. 04 KOVEN FABRIC MILL	0.337	36.3	77.8	0.025	9993	495875	0.768	-4535	83274	78739	1.90						
NO. 05 SAW MILL	0.428	48.0	91.7	0.060	34984	1532014	0.803	-7751	98163	90412	0.20*						
NO. 06 NEWSPRINT MILL	0.329	39.4	91.4	0.046	20229	401891	0.764	-7493	96292	88798	88.68						
NO. 07 WRITING PAPER MILL	0.411	64.8	105.3	0.066	32455	583434	0.766	5829	132309	130218	30.30						
NO. 08 CORRUGATED PAPER	0.420	369.3	578.1	0.017	31203	2564735	0.788	35712	615020	650732	80.74						
NO. 09 BOX BOARD	0.425	100.7	154.7	0.071	40911	706899	0.789	10837	164097	174933	77.21						
NO. 10 CHLORINE	0.413	276.2	499.1	0.145	359740	2275723	0.792	-16981	540818	523838	44.55						
NO. 11 ALUMINA	0.285	52.3	104.7	-0.126	-55624	448741	0.653	-4148	112055	107907	48.52						
NO. 12 LOW DENS. POLYETHYL	0.295	79.0	241.5	-0.233	-140741	1080751	0.739	-53949	258438	204489	28.08						
NO. 13 H.C. DENS. POLYETHYL	0.379	29.0	53.7	0.106	29883	260700	0.777	-472	57565	57093	9.21						
NO. 14 POLYVINYL CHLORIDE	0.308	52.4	93.7	0.075	31724	436662	0.779	513	100219	100732	7.97						
NO. 15 STYRENE-BUT. RUB.	0.362	14.0	24.1	-0.179	-12955	124048	0.731	418	25811	26238	8.58						
NO. 16 NYLON	0.368	10.6	20.7	0.093	9901	100603	0.774	-490	22168	21678	3.83						
NO. 17 STYRENE	0.127	29.0	48.3	-0.092	-62663	320448	0.329	-471	51679	51208	20.86						
NO. 18 ETHYLENE	0.069	85.6	104.6	-0.017	-68162	773774	0.121	-363	107424	107061	15.23						
NO. 19 PETROLEUM REFINING	0.230	1494.9	2713.7	-0.164	-2424895	14456899	0.515	-31793	2904785	2872993	84.25						
NO. 20 TIRES	0.390	67.4	119.1	-0.046	-18493	642819	0.780	1355	127416	128771	12.81						
NO. 23 INTEGRATED STEEL	0.059	268.7	487.4	0.049	519342	4748986	0.092	-71946	521814	449868	98.20						
NO. 24 GRAY IRON FOUNDRY	0.224	34.7	74.2	0.012	6653	405119	0.545	-5499	79390	73892	17.20						
NO. 25 COPPER	0.390	97.7	172.8	-0.027	-15618	790279	0.779	1344	184878	186221	10.30						
NO. 26 MOTOR VEHICLE	0.352	107.3	189.6	-0.081	-61536	1102075	0.780	1834	203082	204916	18.35						
TOTAL -- ALL		3536	6407		-2055681	35583168		-172100	6872096	6699996							
FUEL SAVINGS CASES ONLY		3536	6407		-2055681	35583168		-172100	6872096	6699996							
COST SAVINGS CASES ONLY		1330	2328		1127017	14513637		67819	1772000	1839819							
EMISSIONS SAVINGS CASE ONLY		1000	1642		-36705	8389776		67819	1772000	1839819							
FUEL & COST SAVINGS CASES		1330	2328		1127017	14513637		-62276	2511207	2448930							
FUEL, COST & EMISSION SAVING		537	932		136293	4291728		52891	1011725	1064615							

YEAR : 1990
 NO.30 ADVANCED TECHNOLOGY,FUEL CELL, HIGH TEMP, COAL DER. DIST.
 NATIONAL SUMMARY
 *** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	TOTAL UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS	
					PLANT UTILITY	TOTAL
TOTAL -- ALL	10767	19453	-4231345	105479888	-458140	21050448
FUEL SAVINGS CASES ONLY	10767	19453	-4231345	105479888	-458140	21050448
COST SAVINGS CASES ONLY	5269	9235	3315965	50656880	-45820	10147429
EMISSIONS SAVINGS CASE ONLY	4009	6513	557062	32578224	309084	7262696
FUEL & COST SAVINGS CASES	5269	9235	3315965	50656880	-45820	10147429
FUEL,COST & EMISSION SAVING	3145	5027	933334	24220128	279421	5651688

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE BOILER FUEL	PETROLEUM DISTILLATE FUEL	GAS	DISTILLATE FUEL	COAL FUEL	
TOTAL -- ALL	14654	-425	6082	0	-16427	18238	
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-16427	18238	
COST SAVINGS CASES ONLY	2985	0	1746	0	-7578	7442	
EMISSIONS SAVINGS CASE ONLY	1501	-17	1006	0	-5742	7191	
FUEL & COST SAVINGS CASES	2985	0	1746	0	-7578	7442	
FUEL,COST & EMISSION SAVING	1072	0	890	0	-4429	5593	

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-16427	18238	2197	10767
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-16427	18238	2197	10767
COST SAVINGS CASES ONLY	2985	0	1746	0	-7578	7442	779	5269
EMISSIONS SAVINGS CASE ONLY	1501	-17	1006	0	-5742	7191	72	4009
FUEL & COST SAVINGS CASES	2985	0	1746	0	-7578	7442	779	5269
FUEL,COST & EMISSION SAVING	1072	0	890	0	-4429	5593	21	3145

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	4427	2197	6624
FUEL SAVINGS CASES ONLY	0	0	0	0	0	4427	2197	6624
COST SAVINGS CASES ONLY	0	0	0	0	0	3225	779	4004
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	2542	72	2614
FUEL & COST SAVINGS CASES	0	0	0	0	0	3225	779	4004
FUEL,COST & EMISSION SAVING	0	0	0	0	0	2066	21	2087

CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 31 ADVANCED TECHNOLOGY, FUEL CELL-HIGH TEMP., COAL GASIFIER				STRATEGY OPTIMUM			EMISSIONS SAVINGS			ECS SIZE (T/M)	
	FUEL SAVINGS RATIO	ENERGY TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS RATIO	COST DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	PLANT UTILITY	SAVINGS PER YEAR	TOTAL			
NO. 01 MEAT PACKING	0.322	42.2	74.2	-0.106	-41131	2675577	0.901	25775	79347	105122	6.54*	
NO. 02 BAKING	0.166	6.7	15.7	-0.240	-34207	696137	0.894	4035	16786	20821	0.16*	
NO. 03 MALT BEVERAGE	0.240	35.5	95.5	-0.131	-34577	1942553	0.891	20365	102199	122564	5.27*	
NO. 04 WOVEN FABRIC MILL	0.175	18.9	56.8	-0.043	-17034	1696425	0.694	10416	60743	71159	1.28*	
NO. 05 SAW MILL	0.174	19.5	8.5	0.103	52532	1172495	0.197	13175	9050	22225	0.01*	
NO. 06 NEWSPRINT MILL	0.378	45.4	91.4	0.302	131681	1217676	0.914	9959	96292	106251	68.65	
NO. 07 KRAFT PAPER MILL	0.267	33.8	93.2	0.226	110566	1688950	0.894	28561	117241	143802	26.81	
NO. 08 CORRUGATED PAPER	0.260	227.2	511.9	0.287	538155	6179763	0.896	131822	544524	676367	107.14	
NO. 09 BOX BOARD	0.265	62.7	137.2	0.288	160900	1824271	0.896	36577	145533	182111	68.42	
NO. 10 CHLORINE	0.246	164.7	364.1	0.222	550666	5289865	0.702	69739	394516	464255	30.81	
NO. 11 ALUMINA	0.149	26.0	95.3	0.031	13730	1315000	0.740	12906	102012	114918	44.14	
NO. 12 LOW DENS. POLYETH.	0.102	17.7	47.3	0.064	40696	945307	0.342	9953	50619	60572	5.45*	
NO. 13 HI DENS. POLYETHYL	0.202	15.4	48.9	0.139	39934	901981	0.826	8324	52381	60705	7.96*	
NO. 14 POLYVINYL CHLORIDE	0.229	27.9	80.4	0.137	57977	1534398	0.881	15350	85929	101287	6.83*	
NO. 15 STYRENE-EUT. RUB.	0.225	6.1	21.3	-0.113	-8183	439337	0.830	4462	22810	27272	7.58*	
NO. 16 NYLON	0.193	5.7	16.9	0.092	9801	366394	0.763	3192	18174	21366	3.13*	
NO. 17 STYRENE	0.093	19.0	48.3	-0.054	-36445	872475	0.388	8862	51628	60489	20.84	
NO. 18 ETHYLENE	0.050	63.6	104.3	-0.005	-20557	2007117	0.143	19405	107000	126486	15.17*	
NO. 19 PETROLEUM REFINING	0.114	602.3	1466.5	0.027	399140	20249376	0.440	295803	1569696	1865499	89.62	
NO. 20 TIRES	0.230	37.3	108.9	0.004	1448	2213299	0.890	20713	116532	137244	11.72*	
NO. 23 INTEGRATED STEEL	0.033	150.3	487.4	0.023	249648	9464124	0.098	-44271	521814	477543	98.31	
NO. 24 GRAY IRON FOUNDRY	0.015	2.3	6.6	-0.017	-9218	192773	0.049	-477	7105	6628	1.34*	
NO. 25 COPPER	0.230	54.0	157.7	0.070	40909	2795677	0.890	29433	168736	198169	9.40*	
NO. 26 MOTOR VEHICLE	0.206	59.4	173.6	-0.046	-34697	3656075	0.890	32713	185901	216814	16.79*	
TOTAL -- ALL		1751	4312		2160929	71336880		764800	4626636	5391437		
FUEL SAVINGS CASES ONLY		1751	4312		2160929	71336880		764800	4626636	5391437		
COST SAVINGS CASES ONLY		1495	3716		2396977	57155480		639243	3993042	4633287		
EMISSIONS SAVINGS CASE ONLY		1543	3318		1920499	61660000		809543	4097717	4907267		
FUEL & COST SAVINGS CASES		1495	3716		2396977	57155480		639243	3993042	4633287		
FUEL, COST & EMISSIONS SAVING		1345	3029		2147329	47674358		603514	3471223	4154744		

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUPPLY

YEAR : 1990
NO.31 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP., COAL GASIFIER

*** STRATEGY OPTIMUM

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS ----- TONS PER YEAR -----		
						PLANT	UTILITY	TOTAL
TOTAL -- ALL	5960	14304		9332938	229687152	2665016	15505574	18190592
FUEL SAVINGS CASES ONLY	5960	14304		9332938	229687152	2665016	15505574	18190592
COST SAVINGS CASES ONLY	5069	12452		9980561	163551664	2310977	13554091	15067071
EMISSIONS SAVINGS CASE ONLY	5068	13358		8072079	211138416	2770791	14491736	17262526
FUEL & COST SAVINGS CASES	5059	12452		9980561	166051664	2310977	13554091	15067071
FUEL, COST & EMISSION SAVING	4761	11518		9502033	170672432	2395036	12555073	14951711

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS ----- 10**12 BTU -----		COAL DERIVED DISTILLATE BOILER FUEL	GAS	COAL DISTILLATE BOILER FUEL	OTHER SAVINGS	TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE					
TOTAL -- ALL	14654	-425	6082	0	0	-14214	-2334
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	-14214	-2334
COST SAVINGS CASES ONLY	7373	-400	3979	0	0	-5710	-2108
EMISSIONS SAVINGS CASE ONLY	13117	-425	5504	0	0	-14066	69
FUEL & COST SAVINGS CASES	7373	-408	3979	0	0	-5710	-2108
FUEL, COST & EMISSION SAVING	5908	-408	3406	0	0	-5710	215

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	-14214	-2334	2197	5960
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	-14214	-2334	2197	5960
COST SAVINGS CASES ONLY	7373	-400	3979	0	0	-5710	-2108	2022	5069
EMISSIONS SAVINGS CASE ONLY	13117	-425	5504	0	0	-14066	69	1460	5668
FUEL & COST SAVINGS CASES	7373	-408	3979	0	0	-5710	-2108	2022	5069
FUEL, COST & EMISSION SAVING	5908	-408	3406	0	0	-5710	215	1370	4701

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	2311	-408	1260	0	0	0	1050	2197	7210
FUEL SAVINGS CASES ONLY	2311	-408	1260	0	0	0	1050	2197	7210
COST SAVINGS CASES ONLY	2232	-408	1222	0	0	0	938	2022	6007
EMISSIONS SAVINGS CASE ONLY	845	-408	686	0	0	0	4365	1460	6956
FUEL & COST SAVINGS CASES	2232	-408	1222	0	0	0	938	2022	6007
FUEL, COST & EMISSION SAVING	766	-408	648	0	0	0	3341	1370	5718

CTAS GENERAL SUMMARY - PROCESS LEVEL									
INDUSTRY	NO. 32 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL DERIVED BOILER GRADE				*** STRATEGY OPTIMUM				01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	TOTAL UTILITY SAVINGS	COST DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS PLANT	EMISSIONS SAVINGS UTILITY	
NO. 01 MEAT PACKING	0.377	70.9	130.9	-0.23	-92248	0.539	-44438	139991	95553 11.77
NO. 02 BAKING	0.209	34.0	130.2	-2.134	-304834	0.470	-75351	147851	72499 1.21
NO. 03 MALT BEVERAGE	0.229	52.5	177.3	-1.013	-266836	0.439	-90953	189640	96687 10.06
NO. 04 WOVEN FABRIC MILL	0.261	72.2	247.3	-0.849	-336508	0.485	-126894	264677	137783 5.76
NO. 05 SAW MILL	0.334	37.5	91.7	-0.140	-71678	0.520	-39547	98163	58617 0.20*
NO. 06 NEWSPRINT MILL	0.282	33.9	91.4	0.017	7369	0.473	-41310	96292	54974 27.08
NO. 07 WRITING PAPER MILL	0.270	132.7	438.3	-1.355	-663173	0.489	-260232	551299	291067 28.96
NO. 08 CORRUGATED PAPER	0.250	282.6	831.5	-0.438	-821580	0.443	-399015	884603	485588 29.92
NO. 09 BOX BOARD	0.265	113.5	345.8	-0.647	-371801	0.469	-167542	366691	199149 29.67
NO. 10 CHLORINE	0.302	202.3	499.1	0.040	98564	0.484	-220725	540818	320094 25.49
NO. 11 ALUMINA	0.211	79.9	299.1	-1.001	-443054	0.431	-159355	320198	160843 28.67
NO. 12 LOW DENS. POLYETHYL	0.263	68.4	234.3	-0.225	-143766	0.485	-120325	250780	130455 27.89
NO. 13 HI DENS. POLYETHYL	0.263	60.1	205.8	-0.859	-341233	0.485	-105848	220603	114756 23.88
NO. 14 POLYVINYL CHLORIDE	0.263	109.7	375.8	-1.126	-476.71	0.465	-192816	401863	209047 22.00
NO. 15 STYRENE-DUT. RUB.	0.216	11.4	38.1	-0.791	-56438	0.417	-19674	40915	21241 14.03
NO. 16 NYLON	0.263	21.0	71.7	-0.769	-82009	0.484	-36832	76931	40099 13.71
NO. 17 STYRENE	0.067	15.2	47.2	-0.148	-100591	0.160	-25685	50507	24822 20.93
NO. 18 ETHYLENE	0.043	54.6	100.9	-0.037	-149183	0.057	-53519	103659	50140 15.17
NO. 19 PETROLEUM REFINING	0.135	672.4	2687.7	-0.264	-3889585	0.270	-1381508	2876922	1495414 28.20
NO. 20 TIRES	0.263	141.8	485.8	-1.837	-744154	0.485	-249222	519819	270597 27.00
NO. 23 INTEGRATED STEEL	0.029	133.3	459.1	-0.008	-84089	0.057	-255896	533253	277357 27.62
NO. 24 CRAY IRON FOUNDRY	0.107	16.6	74.2	-0.082	-45585	0.264	-43532	79390	35859 17.68
NO. 25 COPPER	0.263	205.2	702.7	-1.654	-972259	0.485	-361132	751971	390840 28.85
NO. 26 MOTOR VEHICLE	0.254	225.6	772.6	-1.609	-1263435	0.485	-397007	827390	430383 25.74
TOTAL -- ALL		3547	9586		-1151303		-4868355	10334219	5465855
FUEL SAVINGS CASES ONLY		30.7	9585		-1151303		-4868355	10334219	5465855
COST SAVINGS CASES ONLY		216	591		105953		-262043	637110	375067
EMISSIONS SAVINGS CASE ONLY		0	0		0		0	0	0
FUEL & COST SAVINGS CASES		236	591		105953		-262043	637110	375067
FUEL, COST & EMISSION SAVING		0	0		0		0	0	0

YEAR : 1990
 NO. 32 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL DERIVED BOILER GRADE
 NATIONAL SUMMARY

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*** STRATEGY OPTIMUM

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	UTILITY
TOTAL -- ALL	10769	34003			-41048048	269957120			-17705424	37539560
FUEL SAVINGS CASES ONLY	10769	34003			-41048048	269957120			-17705424	37539560
COST SAVINGS CASES ONLY	958	2482			331284	20453264			-1110525	2647517
EMISSIONS SAVINGS CASE ONLY	0	0			0	0			0	0
FUEL & COST SAVINGS CASES	958	2482			331284	20453264			-1110525	2647517
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	6082	0	-4528	0	32789	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-4528	0	32789	2197
COST SAVINGS CASES ONLY	280	0	223	0	-2330	0	2786	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	280	0	223	0	-2330	0	2786	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14654	-425	6082	0	-4528	0	32789	2197
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-4528	0	32789	2197
COST SAVINGS CASES ONLY	280	0	223	0	-2330	0	2786	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	280	0	223	0	-2330	0	2786	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	0	0	0	0	0	0	-1807	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	-1807	2197
COST SAVINGS CASES ONLY	0	0	0	0	0	0	175	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	175	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

Power Systems Division

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CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 33 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL (AFB)				*** STRATEGY OPTIMUM				EMISSIONS SAVINGS			
	FUEL SAVINGS		TOTAL UTILITY		CAPITAL COST \$000		SAVINGS RATIO		PLANT UTILITY		TONS PER YEAR	
	RATIO	SAVINGS	FUEL	SAVINGS	DOLLARS \$000	RATIO	SAVINGS	RATIO	SAVINGS	UTILITY	TOTAL	
NO. 01 MEAT PACKING	0.321	49.1	95.9	0.031	11907	1801112	0.467	-37263	102537	65274	8.76	
NO. 02 BAKING	0.084	14.4	147.2	-2.381	-340019	2935260	0.351	-99901	157478	57578	1.32	
NO. 03 MALT BEVERAGE	0.135	30.6	175.1	-0.559	-147318	2012467	0.349	-109537	187335	77798	10.14	
NO. 04 KOVEN FABRIC MILL	0.161	70.4	408.5	-1.160	-460062	4971137	0.400	-254749	437082	182332	9.70	
NO. 05 SAW MILL	0.186	20.9	8.3	-0.170	-87117	2408103	0.154	8514	8838	17352	0.01*	
NO. 06 NEWSPRINT MILL	0.198	23.7	91.4	0.165	71890	932902	0.388	-51174	96292	45117	28.49	
NO. 07 WRITING PAPER MILL	0.180	106.8	542.4	-0.944	-462350	5232530	0.408	-386311	682231	295920	29.91	
NO. 08 CORRUGATED PAPER	0.176	195.8	809.7	-0.011	-21420	6927006	0.369	-465526	861399	395873	29.70	
NO. 09 BOX BOARD	0.165	77.6	337.9	-0.170	-97674	2837398	0.391	-195902	358360	162458	29.56	
NO. 10 CHLORINE	0.215	143.6	499.1	0.193	478426	4966993	0.398	-277350	540818	263469	25.51	
NO. 11 ALUMINA	0.126	46.8	292.3	-0.516	-228277	2489730	0.348	-185652	313010	127358	28.58	
NO. 12 LOW DENS. POLYETHYL	0.174	67.7	362.4	-0.213	-136143	3056225	0.408	-222283	327820	185536	29.29	
NO. 13 HI DENS. POLYETHYL	0.174	59.4	318.1	-0.816	-229210	2657685	0.408	-195328	340789	145.61	27.24	
NO. 14 POLYVINYL CHLORIDE	0.174	108.7	581.4	-1.081	-457046	4879093	0.408	-356402	621816	265414	26.01	
NO. 15 STYRENE-BUT. RUB.	0.134	7.0	37.6	-0.365	-26366	399664	0.336	-23422	40358	16935	14.12	
NO. 16 NYLON	0.174	20.8	111.4	-0.778	-82963	994542	0.407	-68470	119536	51066	21.70	
NO. 17 STYRENE	0.044	9.9	46.5	0.196	132812	611186	0.127	-30189	49772	19583	20.93	
NO. 18 ETHYLENE	0.019	23.8	101.7	0.358	1454324	1816936	0.030	-77792	104406	26614	15.22	
NO. 19 PETROLEUM REFINING	0.077	491.5	2618.5	0.190	2800494	25501312	0.207	-1671459	2802804	1131345	27.98	
NO. 20 TIRES	0.170	97.4	520.4	-1.244	-504053	5356991	0.400	-319225	556892	237667	29.46	
NO. 23 INTEGRATED STEEL	0.019	84.4	487.4	0.012	127288	7178091	0.047	-294465	521814	227349	29.45	
NO. 24 GRAY IRON FOUNDRY	0.060	9.2	74.2	0.207	115237	806284	0.212	-50696	79390	28694	17.93	
NO. 25 COPPER	0.170	144.5	772.1	-1.065	-625996	6753504	0.400	-474199	826212	352012	24.22	
NO. 26 MOTOR VEHICLE	0.165	163.8	875.2	-1.249	-946232	9565688	0.401	-537532	937256	399724	29.70	
TOTAL -- ALL		206.9	10315		340115	107091936		-6376307	11134236	4757926		
FUEL SAVINGS CASES ONLY		206.9	10315		340115	107091936		-6376307	11134236	4757926		
COST SAVINGS CASES ONLY		835	4015		5192376	43614784		-2490388	4297833	1807444		
EMISSIONS SAVINGS CASE ONLY		21	8		-67117	2408103		8514	8338	17352		
FUEL & COST SAVINGS CASES		835	4015		5192376	43614784		-2490388	4297833	1807444		
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0		

YEAR : 1990
 NO.33 ADVANCED TECHNOLOGY,STIRLING ENGINE,COAL(AFB)
 - COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY
 *** STRATEGY OPTIMUM

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CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	CCST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	PLANT UTILITY	TOTAL
TOTAL -- ALL	7642	38048	-1181515	376817152	-24101872	42158624	18056816
FUEL SAVINGS CASES ONLY	7642	38048	-1181515	376817152	-24101872	42158624	18056816
COST SAVINGS CASES ONLY	2102	9675	19190880	108227248	-6001355	10314310	4312957
EMISSIONS SAVINGS CASE ONLY	40	16	-166987	4615876	16320	16941	33261
FUEL & COST SAVINGS CASES	2102	9675	19190830	108227248	-6001355	10314310	4312957
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM BOILER FUEL	FUEL SAVINGS	COAL DISTILLATE BOILER FUEL	COAL DISTILLATE BOILER FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14654	-425	6082	0	0	2197	7642
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	2197	7642
COST SAVINGS CASES ONLY	12628	0	4611	0	0	2074	2102
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	13	40
FUEL & COST SAVINGS CASES	12628	0	4611	0	0	2074	2102
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	0	2197	7642
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	2197	7642
COST SAVINGS CASES ONLY	12628	0	4611	0	0	2074	2102
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	13	40
FUEL & COST SAVINGS CASES	12628	0	4611	0	0	2074	2102
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14654	-425	6082	0	0	2197	7642
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	0	2197	7642
COST SAVINGS CASES ONLY	12628	0	4611	0	0	2074	2102
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	0	13	40
FUEL & COST SAVINGS CASES	12628	0	4611	0	0	2074	2102
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

Power Systems Division

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CTAS GENERAL SUMMARY - PROCESS LEVEL														
INDUSTRY	NO.34 ADVANCED TECHNOLOGY, THERMIONICS, COAL			DERIVED BOILER GRADE			*** STRATEGY OPTIMUM			EMISSIONS SAVINGS			ECS SIZE (MM)	
	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS	COST DOLLARS \$000	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	SAVINGS TOTAL	----- TOTAL			
NO.01 MEAT PACKING	0.211	22.2	36.1	-0.077	-30040	1026320	0.310	-11214	38660	27446	3.24			
NO.02 BAKING	0.095	3.8	6.3	-0.098	-14001	141913	0.206	-1991	6791	4801	0.05*			
NO.03 MALT BEVERAGE	0.240	20.8	34.4	-0.054	-14172	601142	0.362	-10694	36787	26093	1.92			
NO.04 WOVEN FABRIC MILL	0.101	10.9	17.6	0.001	402	359306	0.132	-5274	18823	13549	0.40*			
NO.05 SAW MILL	0.123	13.8	8.4	0.072	36827	979044	0.111	3465	9025	12490	0.01*			
NO.06 NEWSPRINT MILL	0.093	11.7	20.5	0.027	11963	288673	0.129	-6612	21550	14938	14.65			
NO.07 WRITING PAPER MILL	0.191	21.3	37.6	0.050	24594	652645	0.277	-14694	47337	32643	10.87			
NO.08 CORRUGATED PAPER	0.247	125.9	210.1	0.081	151161	2797980	0.364	-65442	223541	158099	44.20			
NO.09 BOX BOARD	0.216	33.5	59.3	0.064	36618	814893	0.320	-19815	62929	43114	29.74			
NO.10 CHLORINE	0.145	97.3	99.7	0.078	194137	1456113	0.155	-5483	108051	102568	8.46			
NO.11 ALUMINA	0.110	12.3	33.4	-0.018	-7973	460008	0.220	-16231	35781	19550	15.46			
NO.12 LOW DENS. POLYETHYL	0.063	10.9	18.0	0.013	8202	286181	0.077	-5638	19272	13634	2.08			
NO.13 HT DENS. POLYETHYL	0.116	8.8	16.6	0.013	3512	257759	0.160	-6091	17823	11731	2.72			
NO.14 POLYVINYL CHLORIDE	0.142	16.3	30.2	0.017	7220	469619	0.199	-10839	32295	21456	2.58			
NO.15 STYRENE-BUT. RUB.	0.217	4.8	7.6	-0.028	-2017	128061	0.319	-2372	8206	5834	2.74			
NO.16 NYLON	0.115	3.3	5.4	0.026	2766	87975	0.148	-1594	5750	4156	0.99*			
NO.17 STYRENE	0.118	26.8	47.7	-0.110	-74315	726853	0.215	-17628	50974	33346	20.86			
NO.18 ETHYLENE	0.056	69.7	96.7	-0.043	-176222	2037704	0.067	-40126	99357	59231	15.23			
NO.19 PETROLEUM REFINING	0.241	1409.1	2041.8	-0.069	-1021508	28554916	0.341	-527393	2185520	1658127	85.35			
NO.20 TIRES	0.203	22.8	37.2	0.025	10040	682121	0.292	-11274	39755	28481	4.01			
NO.23 INTEGRATED STEEL	0.017	74.8	136.9	0.009	100075	4287658	0.022	-37200	146543	109343	22.20			
NO.24 GRAY IRON FOUNDRY	0.049	7.6	20.1	-0.035	-19299	334391	0.078	-10929	21470	10541	4.08			
NO.25 COPPER	0.205	32.9	53.2	0.044	25924	826598	0.283	-16545	56839	40344	3.19			
NO.26 MOTOR VEHICLE	0.168	35.0	60.3	-0.037	-27681	1157180	0.278	-20049	64622	44573	5.87			

TOTAL - ALL		2097	3135		-773705	49416800		-861662	3357747	2496084				
FUEL SAVINGS CASES ONLY		2097	3135		-773705	49416800		-861662	3357747	2496084				
COST SAVING CASES ONLY		434	751		613522	14249460		-203036	809581	606545				
EMISSIONS SAVINGS CASE ONLY		14	8		36827	979044		3465	9025	12490				
FUEL & COST SAVINGS CASES		424	751		613522	14249460		-203036	809581	606545				
FUEL, COST & EMISSIONS SAVINGS		14	8		36827	979044		3465	9025	12490				

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO. 34 ADVANCED TECHNOLOGY, THERMIONICS, COAL DERIVED BOILER GRADE
*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR			TOTAL
	10**12 BTU		10**12 BTU	\$000		\$000		PLANT	UTILITY		
TOTAL -- ALL	5491	9510		-1627321	135279088			-2581439	9172062		6590622
FUEL SAVINGS CASES ONLY	5491	8510		-1627321	135279088			-2581439	9172062		6590622
COST SAVINGS CASES ONLY	1858	3029		2186290	51315152			-927554	3336992		2409444
EMISSIONS SAVINGS CASE ONLY	26	16		70591	1876641			6642	17299		23940
FUEL & COST SAVINGS CASES	1858	3029		2186290	51315152			-927554	3336992		2409444
FUEL,COST & EMISSION SAVING	26	16		70591	1876641			6642	17299		23940

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED 10**12 BTU		TOTAL FUEL	
	10**12 BTU		10**12 BTU		10**12 BTU	
TOTAL -- ALL	14654	425	0	-24312	7295	5491
FUEL SAVINGS CASES ONLY	14654	425	0	-24312	7295	5491
COST SAVINGS CASES ONLY	3186	0	0	-5138	1288	1858
EMISSIONS SAVINGS CASE ONLY	15	0	0	-29	19	26
FUEL & COST SAVINGS CASES	3186	0	0	-5138	1288	1858
FUEL, COST & EMISSION SAVING	15	0	0	-29	19	26

SITE PLUS UTILITY

TOTAL -- ALL	14654	425	0	-24312	7295	2197	5491
FUEL SAVINGS CASES ONLY	14654	425	0	-24312	7295	2197	5491
COST SAVINGS CASES ONLY	3186	0	0	-5138	1288	717	1858
EMISSIONS SAVINGS CASE ONLY	15	0	0	-29	19	13	26
FUEL & COST SAVINGS CASES	3186	0	0	-5138	1288	717	1858
FUEL, COST & EMISSION SAVING	15	0	0	-29	19	13	26

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	1579	2197	3776
FUEL SAVINGS CASES ONLY	0	0	0	0	1579	2197	3776
COST SAVINGS CASES ONLY	0	0	0	0	1079	717	1796
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	11	13	24
FUEL & COST SAVINGS CASES	0	0	0	0	1079	717	1796
FUEL, COST & EMISSION SAVING	0	0	0	0	11	13	24

CTAS GENERAL SUMMARY - PROCESS LEVEL										DER. B. G. (CORP. CONFIG.)										*** STRATEGY OPTIMUM										EMISSIONS SAVINGS										ECS																													
NO. 35 ADVANCED TECHNOLOGY, THERMIONICS, COAL										FUEL ENERGY TOTAL										CAPITAL COST \$000										SAVINGS RATIO										PLANT TONS PER YEAR										TOTAL										SIZE (MM)									
INDUSTRY										SAVINGS RATIO										FUEL SAVINGS RATIO										FUEL SAVINGS RATIO										FUEL SAVINGS RATIO										FUEL SAVINGS RATIO																			
NO. 01 MEAT PACKING										0.209	28.7	28.7	20.0	-0.392	-152712	1937949	0.386	-38708	86438	47730	7.29																																																
NO. 02 BAKING										0.004	0.1	8.5	-0.291	-41562	279334	0.124	-6187	9084	2897	0.07*																																																	
NO. 03 MALT BEVERAGE										0.141	16.7	66.2	-0.487	-128247	1080767	0.322	-36632	70862	34230	3.74																																																	
NO. 04 WOVEN FABRIC MILL										0.002	0.2	3.1	-0.033	-13171	136607	0.007	-2536	3293	758	0.07*																																																	
NO. 05 SAW MILL										0.156	17.5	3.4	0.118	60360	892613	0.119	9799	3629	13428	0.01*																																																	
NO. 06 NEWSRINT MILL										0.180	21.6	83.1	-0.022	-9518	763140	0.373	-44106	87502	43395	60.93																																																	
NO. 07 WRITING PAPER MILL										0.253	33.7	81.1	-0.009	-4209	1032173	0.419	-41023	101973	60951	23.79																																																	
NO. 08 CORRUGATED PAPER										0.236	240.3	539.2	-0.083	-156298	4819926	0.451	-219564	573617	354052	76.76																																																	
NO. 09 BOX BOARD										0.286	66.0	148.4	-0.034	-19641	1341123	0.451	-60334	157408	97074	75.46																																																	
NO. 10 CHLORINE										0.249	166.4	499.1	0.017	42682	4087148	0.444	-247002	540818	293817	45.66																																																	
NO. 11 ALUMINA										0.130	28.2	133.7	-0.459	-202925	1285842	0.336	-82000	148499	67699	66.13																																																	
NO. 12 LOW DENS. POLYETHYL										0.071	12.4	67.7	-0.081	-51782	859612	0.181	-40460	72473	32013	8.03																																																	
NO. 13 HI DENS. POLYETHYL										0.156	12.9	59.8	-0.151	-42405	708581	0.371	-34349	64036	29687	10.01																																																	
NO. 14 POLYVINYL CHLORIDE										0.152	22.6	107.9	-0.273	-115413	1303013	0.367	-62372	115406	53034	9.44																																																	
NO. 15 STYRENE-BUT. RUB.										0.148	6.5	29.3	-0.770	-55645	373169	0.352	-16831	31415	14585	10.75																																																	
NO. 16 NYLON										0.032	0.9	17.8	-0.251	-26731	273759	0.242	-12356	19135	6779	3.41																																																	
NO. 17 STYRENE										0.078	17.7	47.3	-0.139	-93973	618002	0.172	-23974	50574	26599	20.82																																																	
NO. 18 ETHYLENE										0.038	48.2	94.9	-0.051	-207993	1686975	0.050	-53604	97482	43678	15.20																																																	
NO. 19 PETROLEUM REFINING										0.271	1755.2	2672.1	-0.053	-780076	29553248	0.385	-732667	2860217	2127551	84.12																																																	
NO. 20 TILES										0.170	33.4	143.8	-0.558	-225840	1963951	0.383	-80539	153832	73293	15.90																																																	
NO. 23 INTEGRATED STEEL										0.026	110.4	487.4	-0.023	-245697	6691290	0.054	-258964	521814	262850	67.23																																																	
NO. 24 GRAY IRON FOUNDRY										0.133	20.6	60.6	-0.034	-19036	745510	0.251	-30811	64825	34014	12.26																																																	
NO. 25 COPPER										0.162	46.0	205.7	-0.493	-289703	2418844	0.375	-117213	220078	102865	12.61																																																	
NO. 26 MOTOR VEHICLE										0.164	57.1	232.1	-0.506	-303179	3202132	0.390	-128254	248556	120332	23.09																																																	
TOTAL -- ALL										2771	2771	5378		-3165710	70554496		-2359683	6302989	3943306																																																		
FUEL SAVINGS CASES ONLY										2771	2771	5373		-3165710	70554495		-2359683	6302989	3943306																																																		
COST SAVINGS CASES ONLY										104	104	503		103042	5779780		-237203	544447	307245																																																		
EMISSIONS SAVINGS CASE ONLY										18	18	3		60360	892613		9799	3629	13428																																																		
FUEL & COST SAVINGS CASES										184	184	503		103042	5779780		-237203	544447	307245																																																		
FUEL, COST & EMISSIONS SAVINGS										116	116	3		60360	892613		9799	3629	13428																																																		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 35 ADVANCED TECHNOLOGY, THERMIONICS, COAL DER. B.G. (COMP. CONFIG.)

*** STRATEGY OPTIMUM

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	7460	17706	-10545944	206147584	-7847005	19120272	11273262
FUEL SAVINGS CASES ONLY	7460	17706	-10545944	206147584	-7847005	19120272	11273262
COST SAVINGS CASES ONLY	408	1129	211724	12705963	-536916	1223677	686761
EMISSIONS SAVINGS CASE ONLY	34	7	115699	1710969	18782	6956	25739
FUEL & COST SAVINGS CASES	408	1129	211724	12705963	-536916	1223677	686761
FUEL, COST & EMISSION SAVING	34	7	115699	1710969	18782	6956	25739

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	GAS DISTILLATE	BOILER FUEL	COAL FUEL	
TOTAL -- ALL	14654	-425	6082	0	-31539	16491	7460
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-31539	16491	7460
COST SAVINGS CASES ONLY	119	0	55	0	-1143	1363	408
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	-12	9	34
FUEL & COST SAVINGS CASES	119	0	55	0	-1143	1363	408
FUEL, COST & EMISSION SAVING	15	0	8	0	-12	9	34

SITE PLUS UTILITY

TOTAL -- ALL	14654	-425	6082	0	-31539	16491	7460
FUEL SAVINGS CASES ONLY	14654	-425	6082	0	-31539	16491	7460
COST SAVINGS CASES ONLY	119	0	55	0	-1143	1363	408
EMISSIONS SAVINGS CASE ONLY	15	0	8	0	-12	9	34
FUEL & COST SAVINGS CASES	119	0	55	0	-1143	1363	408
FUEL, COST & EMISSION SAVING	15	0	8	0	-12	9	34

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	0	0	0	0	0	452	2197	2649
FUEL SAVINGS CASES ONLY	0	0	0	0	0	452	2197	2649
COST SAVINGS CASES ONLY	0	0	0	0	0	-20	13	-7
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	25	13	38
FUEL & COST SAVINGS CASES	0	0	0	0	0	-20	13	-7
FUEL, COST & EMISSION SAVING	0	0	0	0	0	25	13	38

TABLE VI-6
MATCH HEAT PUMP STRATEGY

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROGRESS LEVEL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
NO. 1 CURRENT TECHNOLOGY		STEPH TURBINE, 615 PSIA(EXT), PET. B.G.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
INDUSTRY		FUEL ENERGY TOTAL			SAVINGS			FUEL			UTILITY			COST			SAVINGS			DOLLARS			CAPITAL			EMISSIONS			HEAT PUMP			EMISSIONS			SAVINGS			TONS PER YEAR			PLANT			UTILITY			TOTAL			ECS			SIZE			FMS)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	FUEL	RATIO	COST	SAVINGS	DOLLARS	\$000

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1960
NO. 2 CURRENT TECHNOLOGY STEAM TURBINE, 615 PSIA (EXT.), COAL *** STRATEGY HEAT PUMP 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	PLANT UTILITY	TOTAL
TOTAL -- ALL	-5858	9018	-3999032	149412240	603306	9794664	10398173
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	-2203	1582	4236459	52089504	-5191207	1856014	-3333193
EMISSIONS SAVINGS CASE ONLY	0	2548	0	0	15721664	2714211	18435869
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL FUEL
	NATURAL PETROLEUM	PETROLEUM	COAL	DERIVED	
	GAS	DISTILLATE	BOILER FUEL	DISTILLATE	BOILER FUEL

SITE PLUS UTILITY	TOTAL -- ALL	14208	-425	6082	0	0	0	-7190	2197	-5858
	FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
	COST SAVINGS CASES ONLY	4073	0	2141	0	0	0	-9604	1367	-2203
	EMISSIONS SAVINGS CASE ONLY	6464	0	3142	0	0	0	8002	722	0
	FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION	TOTAL -- ALL	14208	-425	6082	0	0	0	-7190	2197	-5858
	FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
	COST SAVINGS CASES ONLY	4073	0	2141	0	0	0	-9604	1367	-2203
	EMISSIONS SAVINGS CASE ONLY	6464	0	3142	0	0	0	8002	722	0
	FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 3 CURRENT TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.		FUEL ENERGY TOTAL UTILITY COST		SAVINGS		*** STRATEGY HEAT PUMP		EMISSIONS SAVINGS	
INDUSTRY	SAVINGS RATIO	FUEL SAVINGS	TOTAL UTILITY SAVINGS	PATIO	DOLLARS \$000	CAPITAL COST \$000	EMISSIONS RATIO	PLANT UTILITY	EMISSIONS SAVINGS TOTAL
NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	33502	51337 84839 0.00
NO. 02 BAYING	0.174	7.0	15.7	-0.229	-32750	208070	-0.017	-35260	16766 -16475 0.20
NO. 03 MALT BEVERAGE	0.000	0.0	10.9	0.000	0	0	0.000	31683	20256 51939 0.00
NO. 04 WOVEN FABRIC MILL	0.215	23.2	77.8	-0.223	-85480	615030	-0.724	-156060	83274 -72785 1.31
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	12986	98163 111149 0.00
NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0.000	17873	96292 114165 0.00
NO. 07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	39091	74301 113392 0.00
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	189040	210524 407564 0.00
NO. 09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	51753	76864 120618 0.00
NO. 10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	106046	540819 648865 0.00
NO. 11 ALUMINA	0.000	0.0	32.0	0.000	0	0	0.000	50357	34273 84630 0.00
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0.000	16289	159054 175345 0.00
NO. 13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0.000	14309	57565 71874 0.00
NO. 14 POLYVINYL CHLORIDE	0.193	22.8	73.7	-0.101	-76377	527550	-0.692	-151392	78782 -72610 1.57
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	9258	4463 13722 0.00
NO. 16 NYLON	0.220	6.4	20.7	-0.192	-20455	130705	-0.744	-42549	22168 -20381 1.37
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	93480	7532 101012 0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	700469	16620 717096 0.00
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2396786	313959 2710745 0.00
NO. 20 TIRES	0.170	18.5	55.8	-0.173	-72261	588698	-0.641	-119676	59693 -59984 1.57
NO. 23 INTEGRATED STEEL	0.000	0.0	457.4	0.000	0	0	0.000	4342768	521814 4864582 0.00
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	50453	79390 129844 0.00
NO. 25 COPPER	0.171	27.4	82.6	-0.163	-96107	710219	-0.651	-177557	88446 -89110 1.54
NO. 26 MOTOR VEHICLE	0.000	0.0	93.6	0.000	0	0	0.000	53626	108465 154091 0.00
TOTAL -- ALL		105	2683		-39430	2788271		7529274	2620845 10350121
FUEL SAVINGS CASES ONLY		105	326		-39430	2788271		-682494	349149 -333345
COST SAVINGS CASES ONLY			0		0	0		0	0
EMISSIONS SAVINGS CASE ONLY		0	2297		0	0		8211769	2471693 10683469
FUEL & COST SAVINGS CASES		0	0		0	0		0	0
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 3 CURRENT TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS		CAPITAL COST \$000		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	DOLLARS \$000	\$000	PLANT UTILITY	TOTAL
TOTAL -- ALL	206	9018	-1024856	7345378	19692656	29487520
FUEL SAVINGS CASES ONLY	206	694	-1024856	7345378	-1862486	956546
COST SAVINGS CASES ONLY	0	0	0	0	0	-905940
EMISSIONS SAVINGS CASE ONLY	0	6124	0	0	21555136	6038324
FUEL & COST SAVINGS CASES	0	0	0	0	0	30393472
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		TOTAL	
	NATURAL GAS	PETROLEUM	DISTILLATE	BOILER FUEL	COAL	FUEL
TOTAL -- ALL	14836	5788	0	0	15579	286
FUEL SAVINGS CASES ONLY	334	-183	0	0	983	286
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14502	5971	0	0	14595	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14836	5788	0	0	15579	286
FUEL SAVINGS CASES ONLY	334	-183	0	0	983	286
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14502	5971	0	0	14595	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14836	5788	0	0	15579	286
FUEL SAVINGS CASES ONLY	334	-183	0	0	983	286
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14502	5971	0	0	14595	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL

NO. 4 CURRENT TECHNOLOGY, DIESEL, LOW SPEED, PETROLEUM	INDUSTRY	FUEL ENERGY TOTAL		BOILER GRADE		CAPITAL COST		EMISSIONS SAVINGS		EMISSIONS SAVINGS		01 ECS SIZE (MW)
		SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	COST DOLLARS \$000	\$000	\$000	PLANT	UTILITY	TOTAL	TOTAL	
NO.01	HEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	33502	51337	84839	0.00
NO.02	BAKING	0.172	6.9	15.7	-0.288	-41129	514850	-0.844	-35867	16785	-19081	0.21*
NO.03	MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	31683	20256	51939	0.00
NO.04	WOVEN FABRIC MILL	0.102	11.0	77.8	-0.361	-143284	1717743	-1.113	-199989	83275	-116714	2.59*
NO.05	SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	12986	98163	111149	0.00
NO.06	NEWSPRINT MILL	0.253	30.3	91.4	0.026	11442	871105	-0.713	17702	96292	-81410	24.37
NO.07	WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	59091	74301	113392	0.00
NO.08	CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	189340	218524	407564	0.00
NO.09	BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	51753	76864	128618	0.00
NO.10	CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	108046	540819	648665	0.00
NO.11	ALUMINA	0.021	2.3	32.0	-0.079	-34757	404766	-0.449	-72251	34273	-37977	18.44
NO.12	LOW DENS. POLYETHYL	0.109	19.1	148.6	-0.167	-119425	1671012	-1.047	-342626	159056	-183570	21.54
NO.13	HI DENS. POLYETHYL	0.003	0.2	53.7	-0.339	-95085	881343	-1.452	-161950	57565	-104385	14.76
NO.14	POLYVINYL CHLORIDE	-0.037	-4.2	73.7	-0.396	-167424	1418974	-1.627	-249372	78782	-170590	12.02
NO.15	STYRENE-BUT RUB.	0.000	0.0	4.2	0.000	0	0	0.000	9258	4463	13722	0.00
NO.16	NYLON	0.057	1.6	20.7	-0.300	-32020	353471	-1.285	-57393	22168	-35225	5.75*
NO.17	STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	93480	7532	101012	0.00
NO.18	ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	700469	16628	717096	0.00
NO.19	PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2396786	313959	2710745	0.00
NO.20	TIRES	0.148	16.2	55.8	-0.074	-29931	838362	-0.520	-108327	59693	-48634	7.00*
NO.23	INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00
NO.24	GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	50453	79390	129644	0.00
NO.25	COPPER	0.000	0.0	82.6	0.000	0	0	0.000	48510	89446	136956	0.00
NO.26	MOTOR VEHICLE	0.000	0.0	93.8	0.000	0	0	0.000	53626	100465	154191	0.00
TOTAL -- ALL			83	2623		-651614	8671622		6755976	2820845	9576824	
FUEL SAVINGS CASES ONLY			28	496		-484190	7252648		-1156103	529107	-626996	
COST SAVINGS CASES ONLY			30	91		11442	871105		-177702	96292	-81410	
EMISSIONS SAVINGS CASE ONLY			0	2054		0	0		8161452	2212959	10374411	
FUEL & COST SAVINGS CASES			30	91		11442	871105		-177702	96292	-81410	
FUEL, COST & EMISSIONS SAVING			0	0		0	0		0	0	0	

YEAR : 1990
 NO. 4 CURRENT TECHNOLOGY, DIESEL, LOW SPEED, PETROLEUM BOILER GRADE
 NATIONAL SUMMARY
 *** STRATEGY HEAT PUMP
 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	TOTAL UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	627	9013	-2609598	44192432	12689936	9794866	22484800
FUEL SAVINGS CASES ONLY	648	3068	-1772671	37109376	-6773348	3260971	-3512376
COST SAVINGS CASES ONLY	450	1359	170014	12943745	-2640467	1430793	-1209669
EMISSIONS SAVINGS CASE ONLY	0	5532	0	0	20708064	6140644	26848704
FUEL & COST SAVINGS CASES	450	1359	170014	12943745	-2640467	1430793	-1209669
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS			10**12 BTU			TOTAL		
	NATURAL GAS	PETROLEUM	DISTILLATE	BOILER FUEL	BOILER FUEL	COAL	OTHER	FUEL	
TOTAL -- ALL	14336	-403	1768	0	0	15579	2197	627	
FUEL SAVINGS CASES ONLY	803	-3030	-3030	0	0	3238	44	648	
COST SAVINGS CASES ONLY	176	0	-1158	0	0	1432	0	450	
EMISSIONS SAVINGS CASE ONLY	13926	0	5356	0	0	11931	2132	0	
FUEL & COST SAVINGS CASES	176	0	-1158	0	0	1432	0	450	
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14836	-403	1768	0	0	15579	2197	627
FUEL SAVINGS CASES ONLY	803	-3030	-3030	0	0	3238	44	648
COST SAVINGS CASES ONLY	176	0	-1158	0	0	1432	0	450
EMISSIONS SAVINGS CASE ONLY	13926	0	5356	0	0	11931	2132	0
FUEL & COST SAVINGS CASES	176	0	-1158	0	0	1432	0	450
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL											
NO. 5 CURRENT TECHNOLOGY, GAS TURBINE, DIELECT FIRED, PETROLEUM DIST		FUEL ENERGY TOTAL		FUEL SAVINGS		PUMP		EMISSIONS SAVINGS			
INDUSTRY	SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	SAVINGS RATIO	CAPITAL COST \$000	HEAT PUMP PLANT UTILITY	TONS PER YEAR	TOTAL SIZE (MM)		
NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	33502	51337	84839	0.00
NO. 02 BAKING	0.000	0.0	15.7	0.000	0	0	0.000	5835	16786	22621	0.00
NO. 03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	31683	20256	51939	0.00
NO. 04 WOVEN FABRIC MILL	0.000	0.0	77.8	0.000	0	0	0.000	17273	83274	100548	0.00
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	12986	98163	111149	0.00
NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0.000	17873	96292	114165	0.00
NO. 07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	39091	74301	113392	0.00
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	189040	218524	407564	0.00
NO. 09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	51753	74301	128619	0.00
NO. 10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	108046	540819	648865	0.00
NO. 11 ALUMINA	0.000	0.0	32.0	0.000	0	0	0.000	50357	34273	84630	0.00
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0.000	16289	159056	175345	0.00
NO. 13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0.000	14309	57565	71874	0.00
NO. 14 POLYVINYL CHLORIDE	0.307	35.4	73.7	0.049	20700	271702	0.643	-11369	78782	67412	6.79
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	9258	4463	13722	0.00
NO. 16 NYLON	0.000	0.0	20.7	0.000	0	0	0.000	5235	22168	27403	0.00
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	93480	7532	101012	0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	700469	16628	717096	0.00
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2396786	313959	2710745	0.00
NO. 20 TIRES	0.268	29.3	55.8	0.026	10582	344125	0.569	-6410	59693	53283	7.37
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	50453	79390	129844	0.00
NO. 25 COPPER	0.287	45.9	82.6	0.046	27011	414785	0.587	-8012	88446	80435	5.74
NO. 26 MOTOR VEHICLE	0.250	52.1	93.9	0.003	2444	512315	0.593	-9079	100465	91366	10.52
TOTAL -- ALL										2820845	10972462
FUEL SAVINGS CASES ONLY										-34870	327385
COST SAVINGS CASES ONLY										-34870	327385
EMISSIONS SAVINGS CASE ONLY										8166466	2493461
FUEL & COST SAVINGS CASES										-34870	327385
FUEL, COST & EMISSION SAVING										0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990
NO. 5 CURRENT TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETROLEUM DIST *** STRATEGY HEAT PUMP 07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS 10**12 BTU		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	FUEL	SAVINGS	FUEL	SAVINGS	\$000	\$000	\$000	\$000	PLANT	UTILITY	SAVINGS	TOTAL
TOTAL -- ALL	434	9018	434	9018	184833	184833	3947676	3947676	21406288	9794866	31201168	31201168
FUEL SAVINGS CASES ONLY	434	838	434	838	184833	184833	3947676	3947676	-104681	896619	791939	791939
COST SAVINGS CASES ONLY	434	838	434	838	184833	184833	3947676	3947676	-104681	896619	791939	791939
EMISSIONS SAVINGS CASE ONLY	0	8190	0	8190	0	0	0	0	21510976	8998249	30409232	30409232
FUEL & COST SAVINGS CASES	434	838	434	838	184833	184833	3947676	3947676	-104681	896619	791939	791939
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED 10**12 BTU		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	COAL	OTHER	SAVINGS
TOTAL -- ALL	14813	5983	0	15579	2197	434
FUEL SAVINGS CASES ONLY	371	6	0	960	46	434
COST SAVINGS CASES ONLY	371	6	0	960	46	434
EMISSIONS SAVINGS CASE ONLY	14442	5977	0	14618	2151	0
FUEL & COST SAVINGS CASES	371	6	0	960	46	434
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14813	-950	5983	0	15579	2197	434
FUEL SAVINGS CASES ONLY	371	-950	6	0	960	46	434
COST SAVINGS CASES ONLY	371	-950	6	0	960	46	434
EMISSIONS SAVINGS CASE ONLY	14442	0	5977	0	14618	2151	0
FUEL & COST SAVINGS CASES	371	-950	6	0	960	46	434
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14813	-950	5983	0	15579	2197	434
FUEL SAVINGS CASES ONLY	371	-950	6	0	960	46	434
COST SAVINGS CASES ONLY	371	-950	6	0	960	46	434
EMISSIONS SAVINGS CASE ONLY	14442	0	5977	0	14618	2151	0
FUEL & COST SAVINGS CASES	371	-950	6	0	960	46	434
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO. 6 CURRENT TECHNOLOGY (CCTB, CICLE, DIP, FIPED, PETROLEUM DIST.)												
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST SAVINGS		DOLLARS \$000		*** STRATEGY HEAT PUMP		EMISSIONS SAVINGS		ECS SIZE (M2)	
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	--- TONS PER YEAR ---	TOTAL		
									PLANT	UTILITY		
NO.01 MEAT PACKING	0.000	0.0	49.0	0.000	0	0	0	0.000	33502	51337	84839	0.00
NO.02 BAKING	0.000	0.0	15.7	0.000	0	0	0	0.000	5835	16786	22621	0.00
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0	0.000	31683	20256	51939	0.00
NO.04 WOVEN FABRIC MILL	0.224	24.1	77.8	-0.245	-97074	1125802	0.601	0.000	-22843	83274	60432	1.97*
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0	0.000	12986	98163	111149	0.00
NO.06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0	0.000	17873	96292	114165	0.00
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0	0.000	39091	74301	113392	0.00
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0	0.000	189040	218524	407564	0.00
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0	0.000	51753	76864	126618	0.00
NO.10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0	0.000	108046	540819	648865	0.00
NO.11 ALUMINA	0.000	0.0	32.0	0.000	0	0	0	0.000	50357	34273	84630	0.00
NO.12 LOW DENS. POLYETHYL	0.259	45.1	148.6	-0.065	-41577	717006	0.653	0.000	-44515	159056	114541	18.32
NO.13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0	0.000	14309	57565	71874	0.00
NO.14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0	0	0	0.000	26099	78782	104880	0.00
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0	0.000	9258	4463	13722	0.00
NO.16 NYLON	0.000	0.0	20.7	0.000	0	0	0	0.000	5235	22168	27403	0.00
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0	0.000	93480	7532	101012	0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0	0.000	700469	16628	717096	0.00
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0	0.000	2396786	313959	2710745	0.00
NO.20 TIRES	0.000	0.0	55.8	0.000	0	0	0	0.000	33888	59693	93580	0.00
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0	0.000	4342768	521814	4864582	0.00
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0	0.000	50453	79390	129844	0.00
NO.25 COPPER	0.000	0.0	82.6	0.000	0	0	0	0.000	48510	88446	136956	0.00
NO.25 MOTOR VEHICLE	0.000	0.0	93.8	0.000	0	0	0	0.000	53626	100465	154091	0.00
TOTAL -- ALL					69	2623	-138651	1842803	8247698	2820845	11068534	
FUEL SAVINGS CASES ONLY					69	226	-138651	1642009	-67358	242331	174973	
COST SAVINGS CASES ONLY					0	0	0	0	0	0	0	
EMISSIONS SAVINGS CASE ONLY					0	2397	0	0	8315046	2578514	10893562	
FUEL & COST SAVINGS CASES					0	0	0	0	0	0	0	
FUEL-COST & EMISSIONS SAVING					0	0	0	0	0	0	0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 6 CURRENT TECHNOLOGY, COND. CYCLE, DIR. FIRED, PETROLEUM DIST. *** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10*12 BTU 10*12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	271	9018	271	391	-393612	5737025	21536816	9794866	31331680	9794866	31331680	9794866
FUEL SAVINGS CASES ONLY	271	391	271	391	-393612	5737025	-265992	953581	687589	953581	687589	953581
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	8127	0	8127	0	0	21802800	8841286	30644096	8841286	30644096	8841286
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10*12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	271	9018	271	391	-393612	5737025	21536816	9794866	31331680	9794866	31331680	9794866
FUEL SAVINGS CASES ONLY	271	391	271	391	-393612	5737025	-265992	953581	687589	953581	687589	953581
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	8127	0	8127	0	0	21802800	8841286	30644096	8841286	30644096	8841286
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10*12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	271	9018	271	391	-393612	5737025	21536816	9794866	31331680	9794866	31331680	9794866
FUEL SAVINGS CASES ONLY	271	391	271	391	-393612	5737025	-265992	953581	687589	953581	687589	953581
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	8127	0	8127	0	0	21802800	8841286	30644096	8841286	30644096	8841286
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10*12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	271	9018	271	391	-393612	5737025	21536816	9794866	31331680	9794866	31331680	9794866
FUEL SAVINGS CASES ONLY	271	391	271	391	-393612	5737025	-265992	953581	687589	953581	687589	953581
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	8127	0	8127	0	0	21802800	8841286	30644096	8841286	30644096	8841286
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										** STRATEGY HEAT PUMP				EMISSIONS SAVINGS		ECS	
NO. 7 ADVANCED TECHNOLOGY STEAM TURBINE 0.15 PSIA EXTY, COAL DER. B.G.										CAPITAL COST \$000		SAVINGS RATIO		PLANT		TOTAL	
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS \$000	EMISSIONS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO	
INDUSTRY	SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS \$000	EMISSIONS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO	
NO.01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	0	0.000	37327	51337	88665	0.00	0.00	0.00	0.00	0.00
NO.02 BAKING	0.000	0.0	15.7	0.000	0	0	0.000	0	0.000	6501	16786	23287	0.00	0.00	0.00	0.00	0.00
NO.03 MALT BEVERAGE	0.000	0.0	10.9	0.000	0	0	0.000	0	0.000	35301	20256	55550	0.00	0.00	0.00	0.00	0.00
NO.04 WOVEN FABRIC MILL	-0.536	-57.7	77.8	-1.000	-396630	-0.147	-0.147	1737294	-0.147	-98327	83274	-15052	2.60	2.60	2.60	2.60	2.60
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	0	0.000	14469	98163	112632	0.00	0.00	0.00	0.00	0.00
NO.06 NEWSPRINT MILL	-0.097	-11.7	91.4	-0.216	-94009	0.195	0.195	451936	0.195	-73677	96292	22614	77.96	77.96	77.96	77.96	77.96
NO.07 WRITING PAPER MILL	-0.013	-1.4	59.1	-0.122	-59773	0.188	0.188	538576	0.188	-52173	74301	22128	20.50	20.50	20.50	20.50	20.50
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	0	0.000	210628	218524	429152	0.00	0.00	0.00	0.00	0.00
NO.09 EOX EOPD	0.000	0.0	72.5	0.000	0	0	0.000	0	0.000	57664	76864	134528	0.00	0.00	0.00	0.00	0.00
NO.10 CHLORINE	-0.168	-112.2	499.1	-0.310	-769693	0.136	0.136	2975507	0.136	-450654	540818	90165	54.53	54.53	54.53	54.53	54.53
NO.11 ALUMINA	-0.450	-50.0	32.0	-0.520	-233483	-0.297	-0.297	474517	-0.297	-60250	34273	-25976	41.21	41.21	41.21	41.21	41.21
NO.12 LOW DENS. POLYETHYL	-0.320	-55.9	149.6	-0.523	-334191	0.061	0.061	1126577	0.061	-148329	159056	10827	23.23	23.23	23.23	23.23	23.23
NO.13 HI DENS. POLYETHYL	-0.506	-38.7	53.7	-0.739	-207547	-0.132	-0.132	592199	-0.132	-67268	57565	-9703	14.66	14.66	14.66	14.66	14.66
NO.14 POLYVINYL CHLORIDE	-0.593	-65.3	73.7	-0.845	-357198	-0.227	-0.227	931864	-0.227	-103257	78782	-24476	11.80	11.80	11.80	11.80	11.80
NO.15 STYRENE-BUT. RUB.	-0.470	-8.9	4.2	-0.675	-49327	-0.366	-0.366	151977	-0.366	-9781	4463	-5318	4.14	4.14	4.14	4.14	4.14
NO.16 NYLON	-0.553	-16.1	20.7	-0.655	-91173	-0.163	-0.163	297949	-0.163	-26739	22168	-4571	5.68	5.68	5.68	5.68	5.68
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	0	0.000	104155	7532	111687	0.00	0.00	0.00	0.00	0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	0	0.000	790461	16629	797089	0.00	0.00	0.00	0.00	0.00
NO.19 PETROLEUM REFINING	-0.170	-693.5	293.3	-0.240	-3540878	-0.157	-0.157	6976766	-0.157	-783149	313958	-469190	80.64	80.64	80.64	80.64	80.64
NO.20 TILES	-0.485	-53.0	55.8	-0.767	-310652	-0.203	-0.203	1107866	-0.203	-79634	59693	-19741	15.16	15.16	15.16	15.16	15.16
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	0	0.000	4342768	521814	4664582	0.00	0.00	0.00	0.00	0.00
NO.24 GRAY IRON FOUNDRY	-0.129	-14.9	74.2	-0.257	-143162	0.070	0.070	531593	0.070	-69897	79390	9493	18.53	18.53	18.53	18.53	18.53
NO.25 COPPER	-0.456	-73.0	82.6	-0.706	-414958	-0.181	-0.181	1357733	-0.181	-114283	89446	-25837	10.70	10.70	10.70	10.70	10.70
NO.26 MOTOR VEHICLE	-0.337	-70.4	93.9	-0.607	-459954	-0.124	-0.124	1605642	-0.124	-120368	100465	-19923	20.44	20.44	20.44	20.44	20.44
TOTAL -- ALL		-1331	2623		-7462024			20913958		3331767	2020943	6152616					
FUEL SAVINGS CASES ONLY		0	0		0			0		0	0	0					
COST SAVINGS CASES ONLY		0	0		0			0		0	0	0					
EMISSIONS SAVINGS CASES ONLY		0	983		0			0		5589274	1027904	6617178					
FUEL & COST SAVINGS CASES		0	0		0			0		0	0	0					
FUEL, COST & EMISSIONS SAVINGS		0	0		0			0		0	0	0					

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 7 ADVANCED TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT.), COAL DER. B.G.

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	UTILITY	EMISSIONS SAVINGS	EMISSIONS SAVINGS
TOTAL -- ALL	-3744	9018			-21644688		67408240		8040107	9794866	17834960	17834960
FUEL SAVINGS CASES ONLY	0	0			0		0		0	0	0	0
COST SAVINGS CASES ONLY	0	0			0		0		0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	2548			0		0		15721684	2714211	10435868	10435868
FUEL & COST SAVINGS CASES	0	0			0		0		0	0	0	0
FUEL, COST & EMISSIONS SAVING	0	0			0		0		0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	OTHER	FUEL
TOTAL -- ALL	14808	-425	6032	0	-20655	15575
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	9464	0	3142	0	8002	722
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSIONS SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	OTHER	FUEL
TOTAL -- ALL	9464	0	3142	0	-2700	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	9464	0	3142	0	8002	722
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSIONS SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	OTHER	FUEL
TOTAL -- ALL	9464	0	3142	0	-2700	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	9464	0	3142	0	8002	722
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSIONS SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL																	
INDUSTRY	NO. 8 ADVANCED TECHNOLOGY, STEAM TO PIPE, 615 PSIA (EXTD), COAL (AFB)										*** STRATEGY HEAT PUMP			EMISSIONS SAVINGS			ECS SIZE (131)
	FUEL ENERGY TOTAL					CAPITAL COST \$000					SAVINGS RATIO		SAVINGS RATIO		SAVINGS RATIO		
	SAVINGS	FUEL	UTILITY	COST	SAVINGS	DOLLARS	\$000	RATIO	SAVINGS	PLANT	UTILITY	PLANT	UTILITY	TOTAL			
NO.01 MEAT PACKING	0.000	0.0	40.0	0.000	0	0	0.000	0.000	37327	51337	88665	0.00					
NO.02 BAKING	0.000	0.0	15.7	0.000	0	0	0.000	0.000	6501	16766	23287	0.00					
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	0.000	35301	20256	55556	0.00					
NO.04 WOVEN FABRIC MILL	-0.679	-73.2	77.8	-0.052	-337727	2936442	-0.304	-0.304	-114450	83274	-31176	2.79					
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	0.000	14469	98163	112632	0.00					
NO.06 NEWSPRINT MILL	-0.103	-12.4	91.4	0.120	52199	692808	0.159	0.159	-77805	96292	18487	79.00					
NO.07 PRINTING PAPER MILL	0.667	7.5	59.1	0.220	107817	854806	0.222	0.222	-48079	74301	26222	21.19					
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	0.000	210628	218524	429152	0.00					
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	0.000	57664	76864	134528	0.00					
NO.10 CHLORINE	-0.169	-113.2	499.1	0.052	130118	4467171	0.102	0.102	-473592	540318	67226	55.11					
NO.11 ALUMINIA	-0.430	-47.7	32.0	-0.203	-89931	713967	-0.316	-0.316	-61945	34273	-27671	41.06					
NO.12 LOW DENS. POLYETHYL	-0.226	-51.6	148.6	-0.116	-74012	1689236	0.043	0.043	-151479	159056	7577	23.29					
NO.13 HI DENS. POLYETHYL	-0.423	-37.7	53.7	-0.321	-90138	971666	-0.166	-0.166	-69759	57565	-12194	15.84					
NO.14 POLYVINYL CHLORIDE	-0.634	-73.0	73.7	-0.453	-191346	1648476	-0.307	-0.307	-111941	78782	-33159	13.09					
NO.15 STYRENE-CUT. RUB.	-0.471	-8.9	4.2	-0.377	-27224	259283	-0.414	-0.414	-10478	4463	-6015	4.38					
NO.16 NYLON	-0.666	-19.2	20.7	-0.549	-56470	497830	-0.292	-0.292	-30353	22168	-8185	6.20					
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	0.000	104155	7532	111667	0.00					
NO.18 ETHYLENE	-0.241	-222.9	16.2	0.166	675323	3018771	-0.283	-0.283	-242150	16628	-225523	37.87					
NO.19 PETROLEUM PEFINING	-0.182	-743.5	293.3	0.199	2927969	11176215	-0.185	-0.185	-868406	313953	-554449	79.26					
NO.20 TIRES	-0.518	-56.6	55.8	-0.417	-165946	1751455	-0.277	-0.277	-86660	59693	-26967	15.18					
NO.23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0	0.000	0.000	4342768	521814	4864592	0.00					
NO.24 GRAY IRON FOUNDRY	-0.149	-23.0	74.2	0.112	62654	881869	0.034	0.034	-74841	79390	4550	16.78					
NO.25 COPPER	-0.522	-93.6	82.6	-0.360	-211504	2170766	-0.283	-0.283	-126809	89446	-40363	10.74					
NO.26 MOTOR VEHICLE	-0.357	-74.4	93.8	-0.308	-233096	2542465	-0.167	-0.167	-130436	100405	-29971	20.58					

TOTAL -- ALL		-1694	5623		2473633	36273184			2127630	2820343	4940479						
FUEL SAVINGS CASES ONLY		7	59		107317	854806			-48079	74301	26222						
COST SAVINGS CASES ONLY		-1168	1033		3956080	21091616			-1784873	1121387	-663486						
EMISSIONS SAVINGS CASE ONLY		0	9.7		0	0			4863013	1011276	5620990						
FUEL & COST SAVINGS CASES		7	59		107317	854806			-48079	74301	26222						
FUEL, COST & EMISSION SAVING		0	0		0	0			0	0	0						

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

100.6 ADVANCED TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL(AFB)

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	UTILITY	PLANT	UTILITY
TOTAL -- ALL	-5860	9018			6482488	128758592	78094	9794864	9872953			
FUEL SAVINGS CASES ONLY	111	878			1602059	12701566	-714402	1104040	389638			
COST SAVINGS CASES ONLY	-3892	4183			13381596	70414560	-6529223	4628113	-1901106			
EMISSIONS SAVINGS CASE ONLY	0	2429			0	0	9967858	2591625	12559484			
FUEL & COST SAVINGS CASES	111	878			1602059	12701566	-714402	1104040	389638			
FUEL, COST & EMISSION SAVING	0	0			0	0	0	0	0			

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	COAL	COAL	OTHER
TOTAL -- ALL	14808	-425	6082	0	-15843	2197
FUEL SAVINGS CASES ONLY	219	0	343	0	-452	0
COST SAVINGS CASES ONLY	11032	0	4215	0	-20517	1387
EMISSIONS SAVINGS CASE ONLY	2734	0	1291	0	7883	722
FUEL & COST SAVINGS CASES	219	0	343	0	-452	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14808	-425	6082	0	-15843	2197	-5860
FUEL SAVINGS CASES ONLY	219	0	343	0	-452	0	111
COST SAVINGS CASES ONLY	11032	0	4215	0	-20517	1387	-3882
EMISSIONS SAVINGS CASE ONLY	2734	0	1291	0	7883	722	0
FUEL & COST SAVINGS CASES	219	0	343	0	-452	0	111
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14803	-425	6082	0	-15843	2197	-5860
FUEL SAVINGS CASES ONLY	219	0	343	0	-452	0	111
COST SAVINGS CASES ONLY	11032	0	4215	0	-20517	1387	-3882
EMISSIONS SAVINGS CASE ONLY	2784	0	1291	0	7883	722	0
FUEL & COST SAVINGS CASES	219	0	343	0	-452	0	111
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO. 9 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL DER. DIST.		FUEL ENERGY TOTAL			UTILITY FUEL		SAVINGS RATIO		DOLLARS \$000		*** STRATEGY HEAT PUMP	
INDUSTRY		SAVINGS RATIO	SAVINGS	FUEL	TOTAL	UTILITY	FUEL	SAVINGS RATIO	SAVINGS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PUMP PLANT
NO. 01 MEAT PACKING		0.000	0.0	43.0	0.000	0	0	0.000	37327	51337	6665	0.00
NO. 02 BAKING		0.000	0.0	15.7	0.000	0	0	0.000	6501	16786	23267	0.00
NO. 03 MALT BEVERAGE		0.000	0.0	18.9	0.000	0	0	0.000	35301	20256	55558	0.00
NO. 04 NOVEN FABRIC MILL		0.000	0.0	77.8	0.000	0	0	0.000	19246	83275	102520	0.00
NO. 05 SAN MILL		0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00
NO. 06 NEWSPRINT MILL		0.000	0.0	91.4	0.000	0	0	0.000	19914	96292	116266	0.00
NO. 07 WRITING PAPER MILL		0.000	0.0	59.1	0.000	0	0	0.000	43555	74301	117656	0.00
NO. 08 CORRUGATED PAPER		0.000	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00
NO. 09 BOX BOARD		0.000	0.0	72.5	0.000	0	0	0.000	57664	76864	134528	0.00
NO. 10 CHLORINE		0.000	0.0	459.1	0.000	0	0	0.000	120305	540819	661204	0.00
NO. 11 ALUMINA		0.000	0.0	32.0	0.000	0	0	0.000	53194	34273	87467	0.00
NO. 12 LOW DENS. POLYETHYL		0.000	0.0	148.6	0.000	0	0	0.000	18149	159056	177205	0.00
NO. 13 HI DENS. POLYETHYL		0.000	0.0	53.7	0.000	0	0	0.000	15943	57565	73508	0.00
NO. 14 POLYVINYL CHLORIDE		0.000	0.0	73.7	0.000	0	0	0.000	29079	78782	107861	0.00
NO. 15 STYRENE-BUT. RUB.		0.000	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00
NO. 16 NYLON		0.000	0.0	20.7	0.000	0	0	0.000	5833	22168	28001	0.00
NO. 17 STYRENE		0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00
NO. 18 ETHYLENE		0.000	0.0	16.2	0.000	0	0	0.000	780461	16629	797088	0.00
NO. 19 PETROLEUM REFINING		0.000	0.0	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00
NO. 20 TIRES		0.000	0.0	55.8	0.000	0	0	0.000	37757	59693	97450	0.00
NO. 23 INTEGRATED STEEL		0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00
NO. 24 GRAY IRON FOUNDRY		0.000	0.0	74.2	0.000	0	0	0.000	56215	79390	135605	0.00
NO. 25 COPPER		0.000	0.0	80.6	0.000	0	0	0.000	54050	89446	142496	0.00
NO. 26 MOTOR VEHICLE		0.000	0.0	93.8	0.000	0	0	0.000	59750	100465	160215	0.00
<hr/>												
TOTAL -- ALL			0	2623		0	0		8802891	2820844	11623739	
FUEL SAVINGS CASES ONLY			0	0		0	0		0	0	0	
COST SAVINGS CASES ONLY			0	0		0	0		0	0	0	
EMISSIONS SAVINGS CASE ONLY			0	2623		0	0		8802891	2820844	11623739	
FUEL & COST SAVINGS CASES			0	0		0	0		0	0	0	
FUEL, COST & EMISSIONS SAVING			0	0		0	0		0	0	0	

CTAS GENERAL SUMMARY - PROCESS LEVEL

INDUSTRY	NO. 10 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL DERIVED BOILER ORD			STRATEGY HEAT PUMP			EMISSIONS SAVINGS			01 ECS SIZE IPM)
	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL SAVINGS	UTILITY SAVINGS	COST DOLLARS \$000	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS PLANT	EMISSIONS SAVINGS TOTAL	
NO. 01 MEAT PACKING	0.000	0.0	0.0	40.0	0.000	0	0	0.000	37327	80645 0.00
NO. 02 BAKING	0.181	7.2	15.7	15.7	-0.303	-0.780	548305	-0.780	-34944	-10150 0.21*
NO. 03 MILK BEVERAGE	0.000	0.0	0.0	10.9	0.000	0	0	0.000	35301	55550 0.00
NO. 04 NOVEN FABRIC MILL	0.200	21.6	77.8	77.8	-0.250	-0.909	1641352	-0.909	-176465	-93190 2.40*
NO. 05 SAW MILL	0.000	0.0	0.0	91.7	0.000	0	0	0.000	14469	112632 0.00
NO. 06 NEWSPRINT MILL	0.328	39.4	91.4	91.4	0.106	-0.593	853504	-0.593	-164073	-67701 20.60
NO. 07 WRITING PAPER MILL	0.000	0.0	0.0	59.1	0.000	0	0	0.000	43555	74301 117056 0.00
NO. 08 CORRUGATED PAPER	0.000	0.0	0.0	205.4	0.000	0	0	0.000	210620	429152 0.00
NO. 09 BOX FORD	0.000	0.0	0.0	72.5	0.000	0	0	0.000	57664	134520 0.00
NO. 10 CHLORIDE	0.300	200.4	499.1	499.1	0.053	-0.601	5359193	-0.601	-991074	-450255 24.90
NO. 11 ALUMINA	0.050	5.6	32.0	32.0	-0.053	-0.304	411611	-0.304	-67901	-33627 10.09
NO. 12 LOW DENS. POLYETHYL	0.205	35.7	148.6	148.6	-0.086	-0.835	1632914	-0.835	-307054	-140000 20.09
NO. 13 HI DENS. POLYETHYL	0.129	9.9	53.7	53.7	-0.198	-1.124	842547	-1.124	-140170	-82613 13.45
NO. 14 POLYVINYL CHLORIDE	0.087	10.0	73.7	73.7	-0.260	-1.203	1364197	-1.203	-217171	-130109 11.05
NO. 15 STYRENE-EUT. RUB.	0.000	0.0	4.2	4.2	0.000	0	0	0.000	10056	14519 0.00
NO. 16 NYLON	0.170	4.9	20.7	20.7	-0.174	-0.996	336589	-0.996	-50064	-27896 5.26*
NO. 17 STYRENE	0.000	0.0	7.0	7.0	0.000	0	0	0.000	104155	7532 111607 0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	16.2	0.000	0	0	0.000	700461	16620 797060 0.00
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	293.3	0.000	0	0	0.000	2670494	313950 2904452 0.00
NO. 20 TIRES	0.165	10.1	55.8	55.8	-0.092	-0.509	941751	-0.509	-109264	-49573 7.40*
NO. 23 INTEGRATED STEEL	0.000	0.0	497.4	497.4	0.000	0	0	0.000	4342760	521814 4864582 0.00
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	74.2	0.000	0	0	0.000	56215	79390 135605 0.00
NO. 25 COPPER	0.167	26.7	92.6	92.6	-0.054	-0.510	1168969	-0.510	-162230	-80446 -73792 5.84*
NO. 26 MOTOR VEHICLE	0.144	30.1	93.0	93.0	-0.111	-0.517	1539040	-0.517	-103223	-100465 -82010 10.60
TOTAL -- ALL	409	409	2623	2623			1662550		5759379	2820344 8500220
FUEL SAVINGS CASES ONLY	409	409	1245	1245			1662550		-2603710	-1266092
COST SAVINGS CASES ONLY	240	240	591	591			6212777		-1155146	-516036
EMISSIONS SAVINGS CASE ONLY	0	0	1379	1379			0		8363092	9348323
FUEL & COST SAVINGS CASES	249	249	591	591			6212777		-1155146	-518036
FUEL, COST & EMISSION SAVINGS	0	0	0	0			0		0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.10 ADVANCED TECHNOLOGY,DIESEL,LOCH SPEED,COAL DERIVED BOILER GRD

**0 STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	1591	9018			-985305		60754304		11401167	9794654
FUEL SAVINGS CASES ONLY	1591	4697			-933305		60754304		-10150872	5233051
COST SAVINGS CASES ONLY	1036	2462			979175		24740400		-4667651	2647519
EMISSIONS SAVINGS CASE ONLY	0	4121			0		0		21632032	4561015
FUEL & COST SAVINGS CASES	1036	2462			979175		24740400		-4667651	2647519
FUEL,COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL	
	NATURAL GAS	PETROLEUM	PETROLEUM	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	COAL FUEL
TOTAL -- ALL	14779	-408	6082		0	0	-5504	15579
FUEL SAVINGS CASES ONLY	1222	-408	600		0	0	-5504	5393
COST SAVINGS CASES ONLY	210	0	223		0	0	-2253	2786
EMISSIONS SAVINGS CASE ONLY	13557	0	5282		0	0	0	10186
FUEL & COST SAVINGS CASES	230	0	223		0	0	-2253	2786
FUEL,COST & EMISSION SAVING	0	0	0		0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14779	-408	6082		0	0	-5504	15579	2197	1591
FUEL SAVINGS CASES ONLY	1222	-408	600		0	0	-5504	5393	88	1591
COST SAVINGS CASES ONLY	210	0	223		0	0	-2253	2786	0	1036
EMISSIONS SAVINGS CASE ONLY	13557	0	5282		0	0	0	10186	2109	0
FUEL & COST SAVINGS CASES	230	0	223		0	0	-2253	2786	0	1036
FUEL,COST & EMISSION SAVING	0	0	0		0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	13557	0	5282		0	0	0	10222	2197	-76
FUEL SAVINGS CASES ONLY	0	0	0		0	0	0	-164	88	-76
COST SAVINGS CASES ONLY	0	0	0		0	0	0	286	0	286
EMISSIONS SAVINGS CASE ONLY	13557	0	5282		0	0	0	10186	2109	0
FUEL & COST SAVINGS CASES	0	0	0		0	0	0	286	0	286
FUEL,COST & EMISSION SAVING	0	0	0		0	0	0	0	0	0

OAS GENERAL SUMMARY - PROCESS LEVEL												
NO.11 ADVANCED TECHNOLOGY DIECAST LOW SPEED, COAL (PULVERIZED)			FUEL ENERGY TOTAL			FUEL SAVINGS			FUEL SAVINGS			
INDUSTRY	FUEL SAVINGS	RATIO	FUEL	UTILITY	COST	FUEL	SAVINGS	RATIO	FUEL	SAVINGS	RATIO	COST
INDUSTRY	FUEL SAVINGS	RATIO	FUEL	UTILITY	COST	FUEL	SAVINGS	RATIO	FUEL	SAVINGS	RATIO	COST
NO.01 MEAT PACKING	0.000	0.0	49.0	0.000	0	0.000	0.0	0.000	0.000	0.000	0.000	0.000
NO.02 BAKING	0.176	7.1	15.7	0.165	-23508	0.165	0	0.000	0.000	0.000	0.000	0.000
NO.03 MALT BEVERAGE	0.000	0.0	10.9	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.04 POWDER FABRIC MILL	0.000	0.0	77.8	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.06 NEWSPRINT MILL	0.267	32.1	91.4	0.312	36201	0.312	0	0.000	0.000	0.000	0.000	0.000
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.09 FLEX BOARD	0.000	0.0	72.5	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.10 CHLORINE	0.272	101.8	499.1	0.298	739115	0.298	0	0.000	0.000	0.000	0.000	0.000
NO.11 ALUMINA	0.027	3.0	32.0	0.021	9482	0.021	0	0.000	0.000	0.000	0.000	0.000
NO.12 LOW DENS. POLYETHYL	0.181	31.7	148.6	0.203	129744	0.203	0	0.000	0.000	0.000	0.000	0.000
NO.13 HI DENS. POLYETHYL	0.062	4.7	53.7	0.073	20482	0.073	0	0.000	0.000	0.000	0.000	0.000
NO.14 POLYVINYL CHLORIDE	0.004	0.4	73.7	0.009	3728	0.009	0	0.000	0.000	0.000	0.000	0.000
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.16 NYLON	0.000	0.0	20.7	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.20 TIRES	0.159	17.3	55.8	0.070	28193	0.070	0	0.000	0.000	0.000	0.000	0.000
NO.23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0.000	0	0.000	0.000	0.000	0.000	0.000
NO.25 COPPER	0.160	25.6	82.6	0.103	60758	0.103	0	0.000	0.000	0.000	0.000	0.000
NO.26 MOTOR VEHICLE	0.139	23.9	93.8	0.029	22084	0.029	0	0.000	0.000	0.000	0.000	0.000
TOTAL -- ALL						333	2623		1126279	16180102	5900463	8721313
FUEL SAVINGS CASES ONLY						333	1147		1126279	16180102	-2437704	-1255530
COST SAVINGS CASES ONLY						333	1131		1149787	15561233	-2451336	-1235947
EMISSIONS SAVINGS CASE ONLY						0	1476		0	8398170	1588672	9976843
FUEL & COST SAVINGS CASES						336	1131		1149787	15561233	-2451336	-1235947
FUEL, COST & EMISSIONS SAVING						0	0		0	0	0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 11 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL (PULVERIZED)

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	1259	9018			4733839	64264752			11223126	9794864 21017984
FUEL SAVINGS CASES ONLY	1259	4692			4733839	64264752			-10461774	5012727 -5449041
COST SAVINGS CASES ONLY	1256	4661			4778899	63078512			-10392064	4980553 -5411506
EMISSIONS SAVINGS CASE ONLY	0	4367			0	0			21684896	4762139 26467040
FUEL & COST SAVINGS CASES	1246	4661			4778899	63078512			-10392064	4980553 -5411506
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	DISTILLATE	PETROLEUM	GAS	DISTILLATE	BOILER FUEL	COAL FUEL
TOTAL -- ALL	14784	-408	6082	0	0	-814	10837	2197
FUEL SAVINGS CASES ONLY	1200	-408	773	0	0	-814	425	83
COST SAVINGS CASES ONLY	1200	-408	768	0	0	-814	429	70
EMISSIONS SAVINGS CASE ONLY	13594	0	5309	0	0	0	10412	2114
FUEL & COST SAVINGS CASES	1200	-408	768	0	0	-814	429	70
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	13618	0	5395	0	0	0	11454	2197	1444
FUEL SAVINGS CASES ONLY	233	0	66	0	0	0	1042	83	1444
COST SAVINGS CASES ONLY	234	0	81	0	0	0	1046	70	1431
EMISSIONS SAVINGS CASE ONLY	13534	0	5309	0	0	0	10412	2114	0
FUEL & COST SAVINGS CASES	234	0	81	0	0	0	1046	70	1431
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	13618	0	5395	0	0	0	11454	2197	1444
FUEL SAVINGS CASES ONLY	233	0	66	0	0	0	1042	83	1444
COST SAVINGS CASES ONLY	234	0	81	0	0	0	1046	70	1431
EMISSIONS SAVINGS CASE ONLY	13534	0	5309	0	0	0	10412	2114	0
FUEL & COST SAVINGS CASES	234	0	81	0	0	0	1046	70	1431
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO.12 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,PETR. BOILER GRD												
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST SAVINGS		DOLLARS \$000		*** STRATEGY HEAT PUMP		EMISSIONS SAVINGS		ECS SIZE (MM)	
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	\$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	TONS PER YEAR	TOTAL		
NO.01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0	0.000	33502	51337	84839	0.00
NO.02 BAKING	0.000	0.0	15.7	0.000	0	0	0	0.000	5835	16786	22621	0.00
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0	0.000	31683	20256	51939	0.00
NO.04 WOVEN FABRIC MILL	0.000	0.0	77.8	0.000	0	0	0	0.000	17273	83274	100548	0.00
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0	0.000	12986	98163	111149	0.00
NO.06 NEWSRINT MILL	0.000	0.0	91.4	0.000	0	0	0	0.000	17873	96292	114165	0.00
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0	0.000	39091	74301	113392	0.00
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0	0.000	189040	218524	407564	0.00
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0	0.000	51753	76864	128618	0.00
NO.10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0	0.000	108046	540819	648865	0.00
NO.11 ALUMINA	0.000	0.0	32.0	0.000	0	0	0	0.000	50357	34273	84630	0.00
NO.12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0	0.000	16289	159056	175345	0.00
NO.13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0	0.000	14309	57565	71874	0.00
NO.14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0	0	0	0.000	26099	78782	104080	0.00
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0	0.000	9258	4463	13722	0.00
NO.16 NYLON	0.000	0.0	20.7	0.000	0	0	0	0.000	5235	22168	27403	0.00
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0	0.000	93480	7532	101012	0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0	0.000	700469	16628	717096	0.00
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0	0.000	2396786	313959	2710745	0.00
NO.20 TIRES	0.000	0.0	55.8	0.000	0	0	0	0.000	33888	59693	93580	0.00
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0	0.000	4342768	521814	4864582	0.00
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0	0.000	58453	79390	129844	0.00
NO.25 COPPER	0.000	0.0	82.6	0.000	0	0	0	0.000	48510	88446	136956	0.00
NO.26 MOTOR VEHICLE	0.000	0.0	93.8	0.000	0	0	0	0.000	53626	100465	154091	0.00
TOTAL -- ALL					0	2623	0	0	8348608	2820845	11169455	
FUEL SAVINGS CASES ONLY					0	0	0	0	0	0	0	
COST SAVINGS CASES ONLY					0	0	0	0	0	0	0	
EMISSIONS SAVINGS CASE ONLY					0	2623	0	0	8348608	2820845	11169455	
FUEL & COST SAVINGS CASES					0	0	0	0	0	0	0	
FUEL,COST & EMISSION SAVING					0	0	0	0	0	0	0	

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.12 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETR. BOILER GRD

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	PLANT	UTILITY	PLANT	UTILITY	PLANT	UTILITY	PLANT	UTILITY
TOTAL -- ALL	0	9018	0	0	0	0	0	0	21917216	9794866
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	9018	0	0	0	0	0	0	21917216	9794866
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS		PETROLEUM		FUEL		COAL		DISTILLATE		BOILER		FUEL		TOTAL	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU
TOTAL -- ALL	14870	0	6082	0	0	0	15579	2197	0	0	0	0	0	0	0	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	15579	2197	0	0	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	PLANT	UTILITY	PLANT	UTILITY	PLANT	UTILITY	PLANT	UTILITY
TOTAL -- ALL	14870	0	6082	0	0	0	0	0	21917216	9794866
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	0	0	21917216	9794866
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL													
NO.13 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL DER. BLR GRD													
INDUSTRY	FUEL ENERGY		TOTAL		UTILITY		FUEL		SAVINGS		RATIO		01 ECS SIZE (T/H)
	SAVINGS	RATIO	SAVINGS	FUEL	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	COST	SAVINGS	RATIO	
*** STRATEGY HEAT PUMP													
CAPITAL COST \$000													
EMISSIONS SAVINGS													
---- TONS PER YEAR ----													
PLANT UTILITY TOTAL													
NO.01 MEAT PACKING	0.000	0.0	0.0	46.0	0.000	0	0	0.000	37327	51337	85665	0.00	
NO.02 BAKING	0.000	0.0	0.0	15.7	0.000	0	0	0.000	6501	16786	23287	0.00	
NO.03 MALT BEVERAGE	0.000	0.0	0.0	18.9	0.000	0	0	0.000	35301	20256	55553	0.00	
NO.04 WOVEN FABRIC MILL	0.000	0.0	0.0	77.8	0.000	0	0	0.000	19246	83275	102520	0.00	
NO.05 SAW MILL	0.000	0.0	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00	
NO.06 NEWSPRINT MILL	0.000	0.0	0.0	91.4	0.000	0	0	0.000	19914	96292	116206	0.00	
NO.07 WRITING PAPER MILL	0.000	0.0	0.0	59.1	0.000	0	0	0.000	43555	74301	117856	0.00	
NO.08 CORRUGATED PAPER	0.000	0.0	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00	
NO.09 BOX BOARD	0.000	0.0	0.0	72.5	0.000	0	0	0.000	57664	76864	134528	0.00	
NO.10 CHLORINE	0.000	0.0	0.0	499.1	0.000	0	0	0.000	120395	540819	661204	0.00	
NO.11 ALUMINA	0.000	0.0	0.0	32.0	0.000	0	0	0.000	53194	34273	87467	0.00	
NO.12 LOW DENS. POLYETHYL	0.000	0.0	0.0	143.6	0.000	0	0	0.000	18149	159056	177205	0.00	
NO.13 HI DENS. POLYETHYL	0.000	0.0	0.0	53.7	0.000	0	0	0.000	15943	57565	73508	0.00	
NO.14 POLYVINYL CHLORIDE	0.000	0.0	0.0	73.7	0.000	0	0	0.000	29079	78782	107861	0.00	
NO.15 STYRENE-BUT. RUB.	0.000	0.0	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00	
NO.16 NYLON	0.000	0.0	0.0	20.7	0.000	0	0	0.000	5833	22168	28001	0.00	
NO.17 STYRENE	0.000	0.0	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00	
NO.18 ETHYLENE	0.000	0.0	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00	
NO.19 PETROLEUM REFINING	0.000	0.0	0.0	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00	
NO.20 TIRES	0.000	0.0	0.0	55.8	0.000	0	0	0.000	37757	59693	97450	0.00	
NO.23 INTEGRATED STEEL	0.000	0.0	0.0	487.4	0.000	0	0	0.000	4342768	521814	4664582	0.00	
NO.24 GRAY IRON FOUNDRY	0.000	0.0	0.0	74.2	0.000	0	0	0.000	56215	79390	135605	0.00	
NO.25 COPPER	0.000	0.0	0.0	82.6	0.000	0	0	0.000	54050	88446	142496	0.00	
NO.26 MOTOR VEHICLE	0.000	0.0	0.0	93.8	0.000	0	0	0.000	59750	100465	160215	0.00	

TOTAL -- ALL		0	0	2623		0	0		6802891	2820944	11623739		
FUEL SAVINGS CASES ONLY		0	0	0		0	0		0	0	0		
COST SAVINGS CASES ONLY		0	0	0		0	0		0	0	0		
EMISSIONS SAVINGS CASE ONLY		0	0	2623		0	0		6802891	2820844	11623739		
FUEL & COST SAVINGS CASES		0	0	0		0	0		0	0	0		
FUEL, COST & EMISSION SAVING		0	0	0		0	0		0	0	0		

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.13 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL DER.BLR GRD *** STRATEGY HEAT PUMP

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	0	9018	0	0	0	0	0	23438048	9794864	33232880
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	9018	0	0	0	0	0	23438048	9794864	33232880
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	BOILER FUEL	DISTILLATE	
TOTAL -- ALL	14870	0	6082	0	0	0	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	2197
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14870	0	6082	0	0	0	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14870	0	6082	0	0	0	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY HEAT PUMP			EMISSIONS SAVINGS			ECS SIZE (MM)
NO.14 ADVANCED TECHNOLOGY, GAS TURBINE, DIRECT FIRED, COAL GASIFIER										CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	SAVINGS RATIO	TONS PER YEAR		TOTAL	
INDUSTRY	FUEL SAVINGS RATIO	ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS	COST DOLLARS \$000	SAVINGS RATIO	SAVINGS RATIO	SAVINGS RATIO	PLANT				UTILITY			
NO.01 HEAT PACKING	0.000	0.0	0.0	43.0	0.000	0	0	0.000	37327	51337	88665	0.00				
NO.02 BAKING	0.000	0.0	0.0	15.7	0.000	0	0	0.000	6501	16786	23287	0.00				
NO.03 MALT DEVERAGE	0.000	0.0	0.0	18.9	0.000	0	0	0.000	35301	20256	55558	0.00				
NO.04 MOVEN FAERIC MILL	0.000	0.0	0.0	77.8	0.000	0	0	0.000	19246	83275	102520	0.00				
NO.05 SAW MILL	0.000	0.0	0.0	91.7	0.000	0	0	0.000	14469	99163	112632	0.00				
NO.06 NEWSPRINT MILL	0.000	0.0	0.0	91.4	0.000	0	0	0.000	19914	96292	116206	0.00				
NO.07 WRITING PAPER MILL	0.000	0.0	0.0	59.1	0.000	0	0	0.000	43555	74301	117856	0.00				
NO.08 CCRUGATED PAPER	0.000	0.0	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00				
NO.09 BOX BOARD	0.000	0.0	0.0	72.5	0.000	0	0	0.000	57664	76864	134528	0.00				
NO.10 CHLORINE	0.000	0.0	0.0	499.1	0.000	0	0	0.000	120385	540819	661204	0.00				
NO.11 ALUMINA	0.000	0.0	0.0	32.0	0.000	0	0	0.000	53194	34273	87467	0.00				
NO.12 LOW DENS. POLYETHYL	0.000	0.0	0.0	148.6	0.000	0	0	0.000	18149	159056	177205	0.00				
NO.13 HI DENS. POLYETHYL	0.000	0.0	0.0	53.7	0.000	0	0	0.000	15943	57565	73508	0.00				
NO.14 POLYVINYL CHLORIDE	0.000	0.0	0.0	73.7	0.000	0	0	0.000	29079	78782	107861	0.00				
NO.15 STYRENE-BUT. RUB.	0.000	0.0	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00				
NO.16 NYLON	0.000	0.0	0.0	20.7	0.000	0	0	0.000	5833	22168	28001	0.00				
NO.17 STYRENE	0.000	0.0	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00				
NO.18 ETHYLENE	0.000	0.0	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00				
NO.19 PETROLEUM REFINING	0.000	0.0	0.0	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00				
NO.20 TIRES	0.000	0.0	0.0	55.8	0.000	0	0	0.000	37757	59693	97450	0.00				
NO.23 INTEGRATED STEEL	0.000	0.0	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00				
NO.24 GRAY IPON FOUNDRY	0.000	0.0	0.0	74.2	0.000	0	0	0.000	56215	79390	135605	0.00				
NO.25 COPPER	0.000	0.0	0.0	82.6	0.000	0	0	0.000	54050	88446	142496	0.00				
NO.26 MOTOR VEHICLE	0.000	0.0	0.0	93.8	0.000	0	0	0.000	59750	100465	160215	0.00				
TOTAL -- ALL										8802891	2820844	11623739				
FUEL SAVINGS CASES ONLY										0	0	0				
COST SAVINGS CASES ONLY										0	0	0				
EMISSIONS SAVINGS CASE ONLY										8802891	2820844	11623739				
FUEL & COST SAVINGS CASES										0	0	0				
FUEL, COST & EMISSION SAVING										0	0	0				

YEAR : 1990
 NO.14 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL GASIFIER
 NATIONAL SUMMARY
 *** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS PLANT TONS PER YEAR	EMISSIONS SAVINGS UTILITY TONS PER YEAR	TOTAL
TOTAL -- ALL	0	9018	0	0	23438046	9794864	33232880
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	9018	0	0	23438046	9794864	33232880
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL,COST & EMISSIONS SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM DISTILLATE	FUEL SAVINGS	10**12 BTU	COAL DERIVED	BOILER FUEL	COAL FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14870	0	6082	0	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSIONS SAVING	0	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14870	0	6082	0	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSIONS SAVING	0	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION	14870	0	6082	0	0	0	15579	2197	0
TOTAL -- ALL	0	0	0	0	0	0	0	0	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSIONS SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
NO.15 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL(PFB)												
INDUSTRY	FUEL ENERGY			UTILITY			SAVINGS			EMISSIONS		
	SAVINGS RATIO	TOTAL FUEL	COST	SAVINGS RATIO	DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	HEAT PUMP PLANT	SAVINGS TOIS PER YEAR UTILITY	SAVINGS TOTAL	ECS SIZE (MM)	
NO.01 MEAT PACKING	0.000	0.0	40.0	0.000	0	0	0.000	37327	51337	60665	0.00	
NO.02 BAKING	0.000	0.0	15.7	0.000	0	0	0.000	6501	16786	23287	0.00	
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	35301	28256	55558	0.00	
NO.04 WOVEN FABRIC MILL	0.000	0.0	77.8	0.000	0	0	0.000	19246	83275	102520	0.00	
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00	
NO.06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0.000	19914	96292	116206	0.00	
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	43555	74301	117856	0.00	
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00	
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	57664	76864	134528	0.00	
NO.10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	120385	540819	661204	0.00	
NO.11 ALUMINA	0.056	6.2	32.0	0.126	55709	473814	0.179	-18636	34273	15638	18.36	
NO.12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0.000	18149	159056	177205	0.00	
NO.13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0.000	15943	57565	73508	0.00	
NO.14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0	0	0.000	29079	78782	107861	0.00	
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00	
NO.16 NYLON	0.000	0.0	20.7	0.000	0	0	0.000	5833	22168	28001	0.00	
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00	
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00	
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	313950	2984452	0.00	
NO.20 TIRES	0.215	23.5	55.8	0.179	72502	1084751	0.363	-22348	59693	37345	6.93	
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00	
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	56215	79390	135605	0.00	
NO.25 COPPER	0.000	0.0	82.6	0.000	0	0	0.000	54050	88446	142496	0.00	
NO.26 MOTOR VEHICLE	0.196	40.9	93.8	0.128	97152	1722453	0.396	-37006	100465	63460	10.19	
TOTAL -- ALL		71	2623		225363	3281017		8574201	2820944	11395048		
FUEL SAVINGS CASES ONLY		71	162		225363	3281017		-77989	194931	116442		
COST SAVINGS CASES ONLY		71	182		225363	3281017		-77989	194931	116442		
EMISSIONS SAVINGS CASE ONLY		0	2441		0	0		8652191	2626414	11276603		
FUEL & COST SAVINGS CASES		71	182		225363	3281017		-77989	194931	116442		
FUEL,COST & EMISSION SAVING		0	0		0	0		0	0	0		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1980

NO.15 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL(PFB)

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT UTILITY	TONS PER YEAR	TOTAL
TOTAL -- ALL	198	9018	934998	10777853	22366112	9794864	32160976
FUEL SAVINGS CASES ONLY	198	644	934998	10777853	-316904	688943	372038
COST SAVINGS CASES ONLY	198	644	934998	10777853	-316904	688943	372038
EMISSIONS SAVINGS CASE ONLY	0	8375	0	0	22683024	9105924	31788960
FUEL & COST SAVINGS CASES	198	644	934998	10777853	-316904	688943	372038
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL FUEL	
	NATURAL PETROLEUM GAS	PETROLEUM DISTILLATE	BOILER FUEL	COAL DERIVED GAS	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14813	-408	6082	0	14432	2197
FUEL SAVINGS CASES ONLY	539	-408	464	0	-422	26
COST SAVINGS CASES ONLY	539	-408	464	0	-422	26
EMISSIONS SAVINGS CASE ONLY	14275	0	5618	0	14654	2171
FUEL & COST SAVINGS CASES	539	-408	464	0	-422	26
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14813	-408	6082	0	14432	2197	198
FUEL SAVINGS CASES ONLY	539	-408	464	0	-422	26	198
COST SAVINGS CASES ONLY	539	-408	464	0	-422	26	198
EMISSIONS SAVINGS CASE ONLY	14275	0	5618	0	14654	2171	0
FUEL & COST SAVINGS CASES	539	-408	464	0	-422	26	198
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14813	-408	6082	0	14432	2197	198
FUEL SAVINGS CASES ONLY	539	-408	464	0	-422	26	198
COST SAVINGS CASES ONLY	539	-408	464	0	-422	26	198
EMISSIONS SAVINGS CASE ONLY	14275	0	5618	0	14654	2171	0
FUEL & COST SAVINGS CASES	539	-408	464	0	-422	26	198
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL													*** STRATEGY HEAT PUMP			EMISSIONS SAVINGS			ECS										
NO.16 ADVANCED TECHNOLOGY GAS TURBINE, INDIRECT FIRED, COAL (AFB)													CAPITAL COST \$000		EMISSIONS SAVINGS RATIO		PLANT UTILITY		TOTAL	SIZE (MM)									
INDUSTRY	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST RATIO	SAVINGS DOLLARS \$000								COST \$000	SAVINGS RATIO	PLANT UTILITY	EMISSIONS TONS PER YEAR	SAVINGS TOTAL	EMISSIONS TONS PER YEAR	SAVINGS TOTAL	SIZE (MM)									
NO.01 MEAT PACKING	0.000	0.0	48.0	0.000	0								0	0.000	37327	51337	88665	0.00											
NO.02 BAKING	0.000	0.0	15.7	0.000	0								0	0.000	6501	16786	23287	0.00											
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0								0	0.000	35301	28256	55558	0.00											
NO.04 WOVEN FABRIC MILL	0.000	0.0	77.8	0.000	0								0	0.000	19246	83275	102520	0.00											
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0								0	0.000	14469	98163	112632	0.00											
NO.06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0								0	0.000	19914	96292	116206	0.00											
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0								0	0.000	43555	74301	117856	0.00											
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0								0	0.000	218628	218524	429152	0.00											
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0								0	0.000	57664	76864	134528	0.00											
NO.10 CHLORINE	0.000	0.0	499.1	0.000	0								0	0.000	120385	540819	661204	0.00											
NO.11 ALUMINA	0.000	0.0	32.0	0.000	0								0	0.000	53194	34273	87467	0.00											
NO.12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0								0	0.000	18149	159056	177205	0.00											
NO.13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0								0	0.000	15943	57565	73508	0.00											
NO.14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0								0	0.000	29079	78782	107861	0.00											
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0								0	0.000	10056	4463	14519	0.00											
NO.16 NYLON	0.000	0.0	20.7	0.000	0								0	0.000	5833	22168	28001	0.00											
NO.17 STYRENE	0.000	0.0	7.0	0.000	0								0	0.000	104155	7532	111687	0.00											
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0								0	0.000	788461	16628	797088	0.00											
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0								0	0.000	2678494	313958	2984452	0.00											
NO.20 TIRES	0.000	0.0	55.8	0.000	0								0	0.000	37757	59693	97450	0.00											
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0								0	0.000	4342768	521814	4864582	0.00											
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0								0	0.000	56215	79390	135605	0.00											
NO.25 COPPER	0.000	0.0	82.6	0.000	0								0	0.000	54050	88446	142496	0.00											
NO.26 MOTOR VEHICLE	0.000	0.0	93.8	0.000	0								0	0.000	59750	100465	160215	0.00											
TOTAL -- ALL					0					2623					8802891					2828344					11623739				
FUEL SAVINGS CASES ONLY					0					0					0					0					0				
COST SAVINGS CASES ONLY					0					0					0					0					0				
EMISSIONS SAVINGS CASE ONLY					0					2623					8802891					2828344					11623739				
FUEL & COST SAVINGS CASES					0					0					0					0					0				
FUEL, COST & EMISSIONS SAVING					0					0					0					0					0				

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.16 ADVANCED TECHNOLOGY,GAS TURBINE,INDIRECT FIRED,COAL(AFB)

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
									PLANT	UTILITY		
TOTAL -- ALL	0	9018	0	0	0	0	0	0	23438048	9794864	33232880	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	9018	0	0	0	0	0	0	23438048	9794864	33232880	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	COAL	OTHER	
TOTAL -- ALL	14670	0	6082	0	15579	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14670	0	6082	0	15579	2197
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	COAL	OTHER	
TOTAL -- ALL	14670	0	6082	0	15579	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14670	0	6082	0	15579	2197
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL													
INDUSTRY	NO. 17 ADVANCED TECHNOLOGY GAS TURBINE-CLOSED CYCLE, COAL DER. B.G.				STRATEGY HEAT PUMP				EMISSIONS SAVINGS				01 ECS SIZE (MM)
	FUEL SAVINGS RATIO	ENERGY TOTAL FUEL	UTILITY SAVINGS	COST DOLLARS	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT	UTILITY	PLANT	UTILITY	PLANT	UTILITY	
NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0.000	37327	51337	80665	0.00			
NO. 02 BAKING	0.193	7.7	15.7	-0.360	-51473	0.467	643802	16786	10870	0.17			
NO. 03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0.000	35301	20256	55558	0.00			
NO. 04 MOVEN FACRIC MILL	0.000	0.0	77.8	0.000	0	0.000	19246	83275	102520	0.00			
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	14469	90163	112632	0.00			
NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0.000	19914	96292	116206	0.00			
NO. 07 MILLING PAPER MILL	0.283	31.5	59.1	0.120	50513	0.425	736788	74301	50043	21.43			
NO. 09 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0.000	210620	210524	429152	0.00			
NO. 09 BOX BOARD	0.000	0.0	72.5	0.000	0	0.000	57664	76864	134528	0.00			
NO. 10 CHLORINE	0.000	0.0	499.1	0.000	0	0.000	120385	540019	661204	0.00			
NO. 11 ALUMINA	0.071	7.9	32.0	-0.026	-11405	0.181	373720	34273	15857	20.95			
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0.000	10149	159056	177205	0.00			
NO. 13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0.000	15943	57565	73500	0.00			
NO. 14 POLYVINYL CHLORIDE	0.274	31.5	73.7	0.083	35168	0.441	696919	78782	47542	7.13			
NO. 15 STYRENE-EUT. RUB.	0.000	0.0	4.2	0.000	0	0.000	10056	4463	14519	0.00			
NO. 16 NYLON	0.000	0.0	20.7	0.000	0	0.000	5833	22168	20001	0.00			
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	104155	7532	111687	0.00			
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	780461	16628	797028	0.00			
NO. 19 PETROLEUM REFINING	0.060	243.3	293.3	0.009	126259	0.070	4739154	313950	207455	28.59			
NO. 20 TIRES	0.233	25.5	55.8	0.025	10211	0.379	770465	59693	36921	7.93			
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0.000	4342768	521814	4864582	0.00			
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0.000	56215	79390	135605	0.00			
NO. 25 COPPER	0.235	37.0	82.6	0.043	25128	0.379	994247	80446	54042	6.23			
NO. 26 MOTOR VEHICLE	0.204	42.5	93.8	-0.018	-13276	0.335	1268832	100465	61651	11.45			
TOTAL -- ALL		423	2623		179126		5568185	2820844	8387034				
FUEL SAVINGS CASES ONLY		428	705		179126		202325	766704	484380				
COST SAVINGS CASES ONLY		369	594		255279		-219170	615100	396002				
EMISSIONS SAVINGS CASE ONLY		0	117		0		5848512	2054142	792657				
FUEL & COST SAVINGS CASES		369	594		255279		-219170	615100	396002				
FUEL, COST & EMISSION SAVING		0	0		0		0	0	0				

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1993

NO. 17 ADVANCED TECHNOLOGY, GAS TURBINE, CLOSED CYCLE, COAL DER. B.G.

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10-12 BTU 10-12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10-12 BTU	10-12 BTU	UTILITY	FUEL	SAVINGS	SAVINGS	SAVINGS	COST	PLANT	UTILITY	SAVINGS	TOTAL
TOTAL -- ALL	1402	1402	5018			1117063	34778256		15530667	9794866	25333728	
FUEL SAVINGS CASES ONLY	1402	1402	2640			1117063	34778256		-1116929	2989743	1872816	
COST SAVINGS CASES ONLY	1224	1224	2098			1359339	27239824		-840377	2409833	1569509	
EMISSIONS SAVINGS CASE ONLY	0	0	6379			0	0		16655798	6605127	23460928	
FUEL & COST SAVINGS CASES	1224	1224	2098			1359339	27239824		-840377	2409833	1569509	
FUEL, COST & EMISSION SAVING	0	0	0			0	0		0	0	0	

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10-12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14784	4314	4314	4314	15579	2197
FUEL SAVINGS CASES ONLY	4786	4314	4314	4314	3365	1368
COST SAVINGS CASES ONLY	4314	4314	4314	4314	2770	1332
EMISSIONS SAVINGS CASE ONLY	4314	4314	4314	4314	12214	829
FUEL & COST SAVINGS CASES	4314	4314	4314	4314	2770	1332
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14784	4314	4314	4314	15579	2197	1402
FUEL SAVINGS CASES ONLY	4786	4314	4314	4314	3365	1368	1402
COST SAVINGS CASES ONLY	4314	4314	4314	4314	2770	1332	1224
EMISSIONS SAVINGS CASE ONLY	4314	4314	4314	4314	12214	829	0
FUEL & COST SAVINGS CASES	4314	4314	4314	4314	2770	1332	1224
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	9089	0	0	0	10820	2197	-25
FUEL SAVINGS CASES ONLY	0	0	0	0	-1393	1368	-25
COST SAVINGS CASES ONLY	0	0	0	0	-1341	1332	-9
EMISSIONS SAVINGS CASE ONLY	9599	0	0	0	12214	829	0
FUEL & COST SAVINGS CASES	0	0	0	0	-1341	1332	-9
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CIAS GENERAL SUMMARY - PROCESS LEVEL

NO.10 ADVANCED TECHNOLOGY, GAS TURNING, CLOSED CYCLE, COAL (AFB)

INDUSTRY	FUEL ENERGY TOTAL			SAVINGS			*** STRATEGY HEAT PUMP			EMISSIONS SAVINGS			OF ECS SIZE (M.I.)
	SAVINGS RATIO	FUEL SAVINGS	UTILITY SAVINGS	COST RATIO	DOLLARS \$000	COST RATIO	SAVINGS RATIO	COST \$000	PLANT SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	
NO.01 MEAT PACKING	0.000	0.0	40.0	0.000	0	0	0.000	0	0.000	37827	51337	88665	0.00
NO.02 BAKING	0.000	0.0	15.7	0.000	0	0	0.000	0	0.000	6501	6786	23287	0.00
NO.03 MALT BEVERAGE	0.112	8.0	10.9	0.035	8102	946329	0.176	-10400	20256	-10400	20256	9708	1.91*
NO.04 KOVEN FABRIC MILL	0.000	0.0	77.8	0.000	0	0	0.000	0	0.000	19246	63275	102520	0.00
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	0	0.000	14899	98163	112632	0.00
NO.06 MENSPOINT MILL	0.000	0.0	91.4	0.000	0	0	0.000	0	0.000	8914	9622	116206	0.00
NO.07 WRITING PAPER MILL	0.239	26.5	59.1	0.311	152329	865872	0.365	-31279	74301	-31279	74301	43022	20.10
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	0	0.000	210628	218524	429152	0.00
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	0	0.000	57664	76864	134528	0.00
NO.10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	0	0.000	120385	540419	661204	0.00
NO.11 ALUMINA	0.002	0.2	32.0	0.087	38695	522239	0.096	-25849	34273	-25849	34273	8425	19.12
NO.12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0.000	0	0.000	18149	159056	177205	0.00
NO.13 HI DENS. POLYETHYL	0.003	0.2	53.7	0.037	24490	668542	0.222	-41271	57565	-41271	57565	16294	10.20
NO.14 POLYVINYL CHLORIDE	0.060	6.9	73.7	0.126	53110	1012388	0.248	-52027	78782	-52027	78782	26760	7.06
NO.15 STYRENE-BUT. RUB.	0.109	2.1	4.2	0.129	9324	156003	0.163	-2072	4463	-2072	4463	2368	2.17*
NO.16 NYLON	0.000	0.0	10.7	0.000	0	0	0.000	0	0.000	5833	22168	28001	0.00
NO.17 STYRENE	0.000	0.0	0	0.000	0	0	0.000	0	0.000	104155	7532	111687	0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	0	0.000	780461	16628	797088	0.00
NO.19 PETROLEUM REFINING	0.029	116.8	293.3	0.361	5325149	7202878	0.032	-218520	313958	-218520	313958	95438	22.82
NO.20 TIRES	0.070	7.6	55.8	0.075	30504	1211766	0.217	-38504	59693	-38504	59693	21189	9.20
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	0	0.000	4342768	521814	4864582	0.00
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	0	0.000	56215	79390	135605	0.00
NO.25 COPPER	0.062	13.2	82.6	0.115	67445	1563031	0.226	-56185	88446	-56185	88446	32262	6.99
NO.26 MOTOR VEHICLE	0.074	15.5	93.8	0.033	25348	1979120	0.235	-62890	100465	-62890	100465	37575	12.87

TOTAL -- ALL		197	2623		5735563	16128167		5254608	2828844	5254608	2828844	8075454	
FUEL SAVINGS CASES ONLY		197	767		5735563	16128167		-539103	832203	-539103	832203	23100	
COST SAVINGS CASES ONLY		197	767		5735563	16128167		-539103	832203	-539103	832203	23100	
EMISSIONS SAVINGS CASE ONLY		0	1856		0	0		5793713	1988643	5793713	1988643	7762359	
FUEL & COST SAVINGS CASES		197	767		5735563	16128167		-539103	832203	-539103	832203	23100	
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0	0	0	

YEAR : 1990
 NO.18 ADVANCED TECHNOLOGY,GAS TURBINE,CLOSED CYCLE,COAL(AFB)
 NATIONAL SUMMARY
 - COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
 NATIONAL SUMMARY
 *** STRATEGY HEAT PUMP
 07

CATEGORY	TOTAL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	PLANT UTILITY	TOTAL
TOTAL -- ALL	754	9018	13572110	52706208	14505133	9794866	24300000
FUEL SAVINGS CASES ONLY	754	2934	13572110	52706208	-1966831	3305510	1336683
COST SAVINGS CASES ONLY	754	2934	13572110	52706208	-1966831	3305510	1336683
EMISSIONS SAVINGS CASE ONLY	0	6034	0	0	16471968	6489357	22961328
FUEL & COST SAVINGS CASES	754	2934	13572110	52706208	-1966831	3305510	1336683
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM DISTILLATE FUEL	BOILER FUEL	PETROLEUM BOILER FUEL	GAS	COAL DISTILLATE BOILER FUEL	COAL FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14809	-425	6082	0	0	0	4026	2197	754
FUEL SAVINGS CASES ONLY	4959	-425	2693	0	0	0	-7862	1389	754
COST SAVINGS CASES ONLY	4959	-425	2693	0	0	0	-7862	1389	754
EMISSIONS SAVINGS CASE ONLY	9850	0	3389	0	0	0	11888	808	0
FUEL & COST SAVINGS CASES	4959	-425	2693	0	0	0	-7862	1389	754
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14809	-425	6082	0	0	0	4026	2197	754
FUEL SAVINGS CASES ONLY	4959	-425	2693	0	0	0	-7862	1389	754
COST SAVINGS CASES ONLY	4959	-425	2693	0	0	0	-7862	1389	754
EMISSIONS SAVINGS CASE ONLY	9850	0	3389	0	0	0	11888	808	0
FUEL & COST SAVINGS CASES	4959	-425	2693	0	0	0	-7862	1389	754
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 19 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIR. FIRED, PETROLEUM B.G.									
INDUSTRY	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL SAVINGS	UTILITY SAVINGS	COST DOLLARS \$000	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS TOTAL
NO. 01 MEAT PACKING	0.000	0.0	0.0	48.0	0.000	0	0	0.000	33502
NO. 02 BAKING	0.000	0.0	0.0	15.7	0.000	0	0	0.000	5835
NO. 03 MALT BEVERAGE	0.000	0.0	0.0	18.9	0.000	0	0	0.000	31683
NO. 04 KOVEN FABRIC MILL	0.000	0.0	0.0	77.8	0.000	0	0	0.000	17273
NO. 05 SAW MILL	0.000	0.0	0.0	91.7	0.000	0	0	0.000	12986
NO. 06 NEWSPRINT MILL	0.000	0.0	0.0	91.4	0.000	0	0	0.000	17873
NO. 07 WRITING PAPER MILL	0.000	0.0	0.0	59.1	0.000	0	0	0.000	39091
NO. 08 CORRUGATED PAPER	0.000	0.0	0.0	205.4	0.000	0	0	0.000	189040
NO. 09 BOX BOARD	0.000	0.0	0.0	72.5	0.000	0	0	0.000	51753
NO. 10 CHLORINE	0.000	0.0	0.0	459.1	0.000	0	0	0.000	108046
NO. 11 ALUMINA	0.000	0.0	0.0	32.0	0.000	0	0	0.000	50357
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	0.0	148.6	0.000	0	0	0.000	16289
NO. 13 HI DENS. POLYETHYL	0.000	0.0	0.0	53.7	0.000	0	0	0.000	14309
NO. 14 POLYVINYL CHLORIDE	0.000	0.0	0.0	73.7	0.000	0	0	0.000	26099
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	0.0	4.2	0.000	0	0	0.000	9258
NO. 16 NYLON	0.000	0.0	0.0	20.7	0.000	0	0	0.000	5235
NO. 17 STYRENE	0.000	0.0	0.0	7.0	0.000	0	0	0.000	93490
NO. 18 ETHYLENE	0.000	0.0	0.0	16.2	0.000	0	0	0.000	700469
NO. 19 PETROLEUM REFINING	0.000	0.0	0.0	293.3	0.000	0	0	0.000	2396786
NO. 20 TIRES	0.000	0.0	0.0	55.8	0.000	0	0	0.000	33888
NO. 23 INTEGRATED STEEL	0.000	0.0	0.0	487.4	0.000	0	0	0.000	4342768
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	0.0	74.2	0.000	0	0	0.000	50453
NO. 25 COPPER	0.000	0.0	0.0	62.6	0.000	0	0	0.000	48510
NO. 26 MOTOR VEHICLE	0.000	0.0	0.0	93.8	0.000	0	0	0.000	53626
TOTAL -- ALL				2623		0	0		8348608
FUEL SAVINGS CASES ONLY				0		0	0		2820845
COST SAVINGS CASES ONLY				0		0	0		0
EMISSIONS SAVINGS CASE ONLY				2623		0	0		8348608
FUEL & COST SAVINGS CASES				0		0	0		2820845
FUEL, COST & EMISSION SAVING				0		0	0		0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

P.O.19 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIR. FIRED, PETROLEUM B.G.

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
TOTAL -- ALL	0	0	0	9018	0	0	0	0	21917216	9794866
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	9018	0	0	0	0	21917216	9794866
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED 10**12 BTU		TOTAL FUEL SAVINGS	
NATURAL PETROLEUM	0	0	0	0	0	0
GAS	0	0	0	0	0	0
DISTILLATE	0	0	0	0	0	0
BOILER FUEL	0	0	0	0	0	0
COAL	0	0	0	0	0	0
OTHER FUEL	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14870	0	0	0	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	0	0	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14870	0	0	0	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	0	0	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
INDUSTRY	NO. 20 ADVANCED TECHNOLOGY		STEAM INJECT. G/T		DIR. FIRED, COAL DER. B.G.		*** STRATEGY HEAT PUMP		ECS SIZE (MM)
	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS	FUEL SAVINGS RATIO	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS PLANT	
NO. 01 HEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	37327	68665 0.00
NO. 02 BAKING	0.000	0.0	15.7	0.000	0	0	0.000	6501	23287 0.00
NO. 03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	35301	55558 0.00
NO. 04 KOVEN FABRIC MILL	0.000	0.0	77.8	0.000	0	0	0.000	19246	102520 0.00
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	112632 0.00
NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0.000	19914	116206 0.00
NO. 07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	43555	117856 0.00
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	210628	429152 0.00
NO. 09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	57664	134528 0.00
NO. 10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	120395	661204 0.00
NO. 11 ALUMINA	0.000	0.0	32.0	0.000	0	0	0.000	53194	87467 0.00
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0.000	18149	177205 0.00
NO. 13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0.000	15943	73508 0.00
NO. 14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0	0	0.000	29079	107861 0.00
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	14519 0.00
NO. 16 NYLON	0.000	0.0	20.7	0.000	0	0	0.000	5633	28001 0.00
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	111687 0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	797088 0.00
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	2984452 0.00
NO. 20 TIRES	0.000	0.0	55.8	0.000	0	0	0.000	37757	97450 0.00
NO. 23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	4864582 0.00
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	56215	135605 0.00
NO. 25 COPPER	0.000	0.0	82.6	0.000	0	0	0.000	54050	142496 0.00
NO. 26 MOTOR VEHICLE	0.000	0.0	93.8	0.000	0	0	0.000	59750	160215 0.00
TOTAL -- ALL		0	2623		0	0		8802891	11623739
FUEL SAVINGS CASES ONLY		0	0		0	0		0	0
COST SAVINGS CASES ONLY		0	0		0	0		0	0
EMISSIONS SAVINGS CASE ONLY		0	2623		0	0		8802891	11623739
FUEL & COST SAVINGS CASES		0	0		0	0		0	0
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.20 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIR. FIRED, COAL DER. B.G.

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	0	9018	0	9018	0	0	0	0	23430046	9794864 33232880
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	9018	0	9018	0	0	0	0	23430046	9794864 33232880
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	DISTILLATE	GAS	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14870	0	6082	0	0	0	15579	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	15579	2197
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14870	0	6082	0	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14870	0	6082	0	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL													
NO.21 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIRECT FIRED, COAL (PFB)													
INDUSTRY	FUEL SAVINGS RATIO	FUEL TOTAL	UTILITY SAVINGS	COST RATIO	SAVINGS DOLLARS	*** STRATEGY HEAT PUMP			EMISSIONS SAVINGS			01	
						CAPITAL COST	SAVINGS RATIO	PLANT	TONS PER YEAR	UTILITY	TOTAL	EC	SIZE (MW)
NO.01 HEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	37327	51337	88665	0.00		
NO.02 BAKING	0.000	0.0	15.7	0.000	3	0	0.000	6501	16736	23267	0.00		
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	35301	20256	55558	0.00		
NO.04 MOVEN FABRIC MILL	0.063	6.8	77.8	-0.128	-50598	1769229	0.329	-49594	83275	33681	2.03*		
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00		
NO.06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0.000	19914	96292	116206	0.00		
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	43555	74301	117856	0.00		
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00		
NO.09 EOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	57664	76864	134528	0.00		
NO.10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	120395	540819	661204	0.00		
NO.11 ALUMINA	0.000	0.0	32.0	0.000	0	0	0.000	53194	34273	87467	0.00		
NO.12 LOW DENS. POLYETHYL	-0.005	-0.9	148.6	0.039	24819	1546557	0.306	-104902	159056	54154	18.65		
NO.13 HI DENS. POLYETHYL	0.019	1.5	53.7	0.039	11001	750969	0.285	-36624	57565	20941	18.86		
NO.14 POLYVINYL CHLORIDE	0.000	9.2	73.7	0.129	54371	992662	0.309	-45481	78782	33300	6.70*		
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00		
NO.16 NYLON	0.089	2.6	20.7	0.077	8259	297586	0.339	-12689	22168	9479	3.91*		
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00		
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00		
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	313958	2984452	0.00		
NO.20 TIRES	0.065	7.1	55.8	0.106	43106	1062162	0.259	-34490	59693	25202	7.40*		
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00		
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	56215	79390	135605	0.00		
NO.25 COPPER	0.066	10.6	82.6	0.137	80792	1348361	0.258	-51707	88446	36740	5.84*		
NO.26 MOTOR VEHICLE	0.057	12.0	93.8	0.056	42718	1669369	0.263	-58344	100465	42121	10.69		
TOTAL -- ALL		49	2623		214469	9446893		6169252	2820844	10990099			
FUEL SAVINGS CASES ONLY		50	453		189650	7900336		-288930	490393	201463			
COST SAVINGS CASES ONLY		42	529		265067	7677664		-348238	56175	221936			
EMISSIONS SAVINGS CASE ONLY		0	2016		0	0		8563086	2171397	10734465			
FUEL & COST SAVINGS CASES		43	380		240247	6131108		-239336	407118	167782			
FUEL, COST & EMISSION SAVING		0	0		0	0		0	0	0			

YEAR : 1990
 HD.21 ADVANCED TECHNOLOGY, STEAM INJECT. G/T, DIRECT FIRED, COAL (PFB) *** STRATEGY HEAT PUMP
 NATIONAL SUPPLY

07

CATEGORY	TOTAL SAVINGS 10**12 BTU	UTILITY SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	PLANT UTILITY	TOTAL
TOTAL -- ALL	129	9018	714591	28916128	21406512	9794864	31201392
FUEL SAVINGS CASES ONLY	133	1312	590701	21196192	-832222	1404290	572069
COST SAVINGS CASES ONLY	116	1905	811577	25524948	-1260800	2038629	777829
EMISSIONS SAVINGS CASE ONLY	0	6964	0	0	22762384	7596618	30359008
FUEL & COST SAVINGS CASES	120	1163	687687	17804912	-737160	1244669	507509
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	NATURAL GAS	PETROLEUM DISTILLATE FUEL	COAL DISTILLATE FUEL	GAS DISTILLATE BOILER FUEL	COAL DISTILLATE BOILER FUEL	OTHER SAVINGS	TOTAL FUEL
TOTAL -- ALL	14908	0	6082	0	0	2197	129
FUEL SAVINGS CASES ONLY	452	0	153	0	0	63	133
COST SAVINGS CASES ONLY	501	0	158	0	0	71	116
EMISSIONS SAVINGS CASE ONLY	14289	0	5906	0	0	2121	0
FUEL & COST SAVINGS CASES	434	0	135	0	0	59	120
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14908	0	6082	0	0	2197	129
FUEL SAVINGS CASES ONLY	452	0	153	0	0	63	133
COST SAVINGS CASES ONLY	501	0	158	0	0	71	116
EMISSIONS SAVINGS CASE ONLY	14289	0	5906	0	0	2121	0
FUEL & COST SAVINGS CASES	434	0	135	0	0	59	120
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14908	0	6002	0	0	2197	129
FUEL SAVINGS CASES ONLY	452	0	153	0	0	63	133
COST SAVINGS CASES ONLY	501	0	158	0	0	71	116
EMISSIONS SAVINGS CASE ONLY	14289	0	5906	0	0	2121	0
FUEL & COST SAVINGS CASES	434	0	135	0	0	59	120
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO.22 ADVANCED TECHNOLOGY, STEAM INJECTED G/T, INDIRECT FIRED, COAL (AFB)									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY FULL		COST SAVINGS		STRATEGY HEAT PUMP		ECS SIZE (MM)
	SAVINGS RATIO	FULL	SAVINGS RATIO	FULL	DOLLARS \$000	COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	
NO.01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	37327	88665 0.00
NO.02 BAKING	-0.013	-0.5	15.7	-0.327	-46635	613525	0.181	-12563	4223 0.19*
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	35301	55558 0.00
NO.04 KOVEN FABRIC MILL	-0.097	-10.5	77.8	-0.221	-87514	1811442	0.155	-67421	15854 2.08*
NO.05 SAN MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	112632 0.00
NO.06 NEWSPRINT MILL	-0.300	-36.1	91.4	-0.108	-47027	1000730	0.010	-95151	1141 88.66
NO.07 WRITING PAPER MILL	-0.039	-4.3	59.1	0.081	39731	1087377	0.134	-58465	15836 25.70
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	210628	429152 0.00
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	57664	134528 0.00
NO.10 CHLORINE	-0.222	-148.8	499.1	-0.040	-98143	5275323	0.064	-498468	42350 51.96
NO.11 ALUMINA	-0.104	-11.6	32.0	0.043	18845	482563	0.003	-33994	280 20.06
NO.12 LOW DENS. POLYETHYL	-0.305	-53.2	148.6	-0.146	-93634	1672799	0.039	-152115	6942 19.90
NO.13 HI DENS. POLYETHYL	-0.141	-10.8	53.7	-0.037	-10304	728541	0.109	-49532	8033 11.01
NO.14 POLYVINYL CHLORIDE	-0.059	-6.8	73.7	0.053	22336	1000204	0.157	-61858	16924 6.97*
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	14519 0.00
NO.16 NYLON	-0.069	-2.0	20.7	-0.008	-866	302813	0.173	-17326	4842 4.07*
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	111687 0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	797088 0.00
NO.19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	2670494	2984452 0.00
NO.20 TIRES	-0.043	-5.3	55.8	0.046	18472	1072263	0.127	-47325	12367 7.66*
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	4844562 0.00
NO.24 GRAY IRON FOUNDRY	-0.051	-8.0	74.2	0.142	78952	927783	0.113	-64083	15307 18.24
NO.25 COPPER	-0.049	-7.8	82.6	0.075	43660	1367105	0.125	-70705	17742 6.05*
NO.26 MOTOR VEHICLE	-0.042	-8.8	93.8	0.008	5720	1664084	0.129	-79853	20512 11.07
TOTAL -- ALL		-314	2623		-156205	19006544		6954462	9775311
FUEL SAVINGS CASES ONLY		0	0		0	0		0	0
COST SAVINGS CASES ONLY		-53	471		227917	7601379		-416283	515350
EMISSIONS SAVINGS CASE ONLY		0	1045		0	0		8263323	1329539
FUEL & COST SAVINGS CASES		0	0		0	0		0	0
FUEL, COST & EMISSIONS SAVING		0	0		0	0		0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.22 ADVANCED TECHNOLOGY, STEAM INJECTED G/T, INDIRECT FIRED, COAL (AFB)

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	-1494	9018	-510703	80478128	15081360	9794866	24876208
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	-278	2190	1187199	36275952	-2053139	2507947	454808
EMISSIONS SAVINGS CASE ONLY	0	3101	0	0	20877088	3305604	24162688
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---					TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	COAL DISTILLATE	BOILER FUEL	
TOTAL -- ALL	14779	-408	6082	0	0	-1494
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	1084	-408	849	0	-1928	-278
EMISSIONS SAVINGS CASE ONLY	13267	0	4935	0	6949	2031
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14779	-408	6082	0	0	5037	2197	-1494
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	1084	-408	849	0	-1928	-278	124	-278
EMISSIONS SAVINGS CASE ONLY	13267	0	4935	0	6949	2031	2031	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14779	-408	6082	0	0	5037	2197	-1494
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	1084	-408	849	0	-1928	-278	124	-278
EMISSIONS SAVINGS CASE ONLY	13267	0	4935	0	6949	2031	2031	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INDUSTRY	CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY HEAT PUMP				EMISSIONS SAVINGS		01 ECS SIZE (MM)
	NO. 23 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, PETROLEUM B.G.	FUEL ENERGY TOTAL	UTILITY	FUEL	SAVINGS	RATIO	COST	SAVINGS	DOLLARS	COST	CAPITAL	SAVINGS	SAVINGS	SAVINGS	SAVINGS	SAVINGS	
		SAVINGS	FUEL	SAVINGS	RATIO												
INDUSTRY	NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	0	0.000	33502	51337	84839	0.00	0.00	0.00	0.00
	NO. 02 BAKING	0.000	0.0	15.7	0.000	0	0	0.000	0	0.000	5835	16786	22621	0.00	0.00	0.00	0.00
	NO. 03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	0	0.000	31683	20256	51939	0.00	0.00	0.00	0.00
	NO. 04 MOTTEN FABRIC MILL	0.000	0.0	77.0	0.000	0	0	0.000	0	0.000	17273	83274	100548	0.00	0.00	0.00	0.00
	NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	0	0.000	12986	98163	111149	0.00	0.00	0.00	0.00
	NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0.000	0	0.000	17873	96292	114165	0.00	0.00	0.00	0.00
	NO. 07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	0	0.000	39091	74301	113392	0.00	0.00	0.00	0.00
	NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	0	0.000	189040	218524	407564	0.00	0.00	0.00	0.00
	NO. 09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	0	0.000	51753	76864	128618	0.00	0.00	0.00	0.00
	NO. 10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0.000	0	0.000	108046	540819	648865	0.00	0.00	0.00	0.00
	NO. 11 ALUMINA	0.000	0.0	32.0	0.000	0	0	0.000	0	0.000	50357	34273	84630	0.00	0.00	0.00	0.00
	NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0.000	0	0.000	16289	159056	175345	0.00	0.00	0.00	0.00
	NO. 13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0.000	0	0.000	14305	57565	71874	0.00	0.00	0.00	0.00
	NO. 14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0	0	0.000	0	0.000	26899	78782	104880	0.00	0.00	0.00	0.00
	NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	0	0.000	9258	4463	13722	0.00	0.00	0.00	0.00
	NO. 16 NYLON	0.000	0.0	20.7	0.000	0	0	0.000	0	0.000	5235	22168	27403	0.00	0.00	0.00	0.00
	NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	0	0.000	93480	7532	101012	0.00	0.00	0.00	0.00
	NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	0	0.000	700469	16628	717096	0.00	0.00	0.00	0.00
	NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0.000	0	0.000	2396786	313959	2710745	0.00	0.00	0.00	0.00
	NO. 20 TIRES	0.000	0.0	55.8	0.000	0	0	0.000	0	0.000	33868	59693	93500	0.00	0.00	0.00	0.00
	NO. 23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0	0.000	0	0.000	4342768	521814	4864582	0.00	0.00	0.00	0.00
	NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	0	0.000	50453	79390	129844	0.00	0.00	0.00	0.00
	NO. 25 COPPER	0.000	0.0	32.6	0.000	0	0	0.000	0	0.000	48510	88446	136956	0.00	0.00	0.00	0.00
	NO. 26 MOTOR VEHICLE	0.000	0.0	93.8	0.000	0	0	0.000	0	0.000	53626	100465	154091	0.00	0.00	0.00	0.00
	TOTAL -- ALL		0	2623		0	0		0		8348609	2820645	11169455				
	FUEL SAVINGS CASES ONLY		0	0		0	0		0		0	0	0				
	COST SAVINGS CASES ONLY		0	0		0	0		0		0	0	0				
	EMISSIONS SAVINGS CASE ONLY		0	2623		0	0		0		8348609	2820645	11169455				
	FUEL & COST SAVINGS CASES		0	0		0	0		0		0	0	0				
	FUEL, COST & EMISSION SAVING		0	0		0	0		0		0	0	0				

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 23 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, PETROLEUM B.G.

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	0	0	9018	0	0	0	0	0	21917216	9794866 31712096
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0	9018	0	0	0	0	0	21917216	9794866 31712096
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	COAL	OTHER	FUEL
TOTAL -- ALL	14870	0	0	0	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	14870	0	0	0	2197	0
EMISSIONS SAVINGS CASE ONLY	0	0	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

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CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 24 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, COAL DER. B.G.									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY COST		SAVINGS		*** STRATEGY HEAT PUMP		
	SAVINGS	FUEL	SAVINGS	RATIO	SAVINGS	DOLLARS	CAPITAL COST \$000	EMISSIONS	SAVINGS
	RATIO		SAVINGS					PLANT	TONS PER YEAR
								UTILITY	----- TOTAL -----
NO. 01 HEAT PICKING	0.000	0.0	49.0	0.000	0	0.000	37327	51337	88665 0.00
NO. 02 BAKING	0.000	0.0	15.7	0.000	0	0.000	6501	16706	23207 0.00
NO. 03 MALT BEVERAGE	0.000	0.0	10.9	0.000	0	0.000	35301	20256	55550 0.00
NO. 04 WOVEN FABRIC MILL	0.000	0.0	77.0	0.000	0	0.000	19246	83275	102520 0.00
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	14469	90163	112632 0.00
NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0.000	19914	96292	116206 0.00
NO. 07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0.000	43555	74301	117056 0.00
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0.000	210628	210524	429152 0.00
NO. 09 BOX BOARD	0.000	0.0	72.5	0.000	0	0.000	57664	76064	134520 0.00
NO. 10 CHLORINE	0.000	0.0	499.1	0.000	0	0.000	120305	540019	661204 0.00
NO. 11 ALUMINA	0.000	0.0	32.0	0.000	0	0.000	53194	34273	87467 0.00
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0.000	10149	159056	177205 0.00
NO. 13 HT DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0.000	15943	57545	73500 0.00
NO. 14 POLYVINYL CHLORIDE	0.000	0.0	73.7	0.000	0	0.000	29079	70702	107061 0.00
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0.000	10056	4463	14519 0.00
NO. 16 NYLON	0.000	0.0	20.7	0.000	0	0.000	5033	22160	20001 0.00
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	104155	7532	111607 0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	700461	16620	797000 0.00
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0.000	2670494	313950	2984452 0.00
NO. 20 TIRES	0.000	0.0	55.0	0.000	0	0.000	37757	59693	97450 0.00
NO. 23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0.000	4342760	521014	4664502 0.00
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0.000	56215	79390	135605 0.00
NO. 25 COPPER	0.000	0.0	82.6	0.000	0	0.000	54050	80446	142496 0.00
NO. 26 MOTOR VEHICLE	0.000	0.0	93.0	0.000	0	0.000	59750	100465	160215 0.00

TOTAL -- ALL	0	0	2623	0	0	0	0002091	2020044	11023739
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	0	2623	0	0	0	0002091	2020044	11023739
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSIONS SAVING	0	0	0	0	0	0	0	0	0

YEAR : 1990
 10.24 ADVANCED TECHNOLOGY, COB. CYCLE, DIRECT FIRED, COAL DER. B.G.
 NATIONAL SUMMARY

07

*** STRATEGY HEAT PUMP

CATEGORY	TOTAL FUEL SAVINGS 10 ⁶ BTU 10 ⁶ BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS	
					PLANT UTILITY	TOTAL
TOTAL -- ALL	0	9018	0	0	23430048	9794864 33232000
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	9018	0	0	0	0
FUEL & COST SAVINGS CASES	0	0	0	0	23430048	9794864 33232000
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS					EMISSIONS SAVINGS	
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	GAS DISTILLATE	COAL DERIVED BOILER FUEL	COAL FUEL	TOTAL FUEL
TOTAL -- ALL	14370	0	6082	0	0	15579	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14370	0	6082	0	0	15579	2197
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14370	0	6082	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14370	0	6082	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14370	0	6082	0	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14370	0	6082	0	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL										*** STRATEGY HEAT PUMP				EMISSIONS SAVINGS		ECS	
NO.25 ADVANCED TECHNOLOGY, COMBINED CYCLE, DIRECT FIRED, COAL (PFB)										CAPITAL COST \$000		SAVINGS RATIO		PLANT UTILITY		SIZE (MM)	
INDUSTRY	FUEL SAVINGS RATIO	ENERGY TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	SAVINGS DOLLARS \$000	SAVINGS RATIO	PLANT UTILITY	PLANT UTILITY	SAVINGS DOLLARS \$000	SAVINGS RATIO
NO.01 MEAT PACKING	0.000	0.0	0.0	48.0	0.000	0	0.000	0	0.000	0	0.000	37327	51337	88665	0.00	0.00	0.00
NO.02 BAKING	0.000	0.0	0.0	15.7	0.000	0	0.000	0	0.000	0	0.000	6501	16786	23287	0.00	0.00	0.00
NO.03 MALT BEVERAGE	0.000	0.0	0.0	18.9	0.000	0	0.000	0	0.000	0	0.000	35301	20256	55558	0.00	0.00	0.00
NO.04 KOVEN FABRIC MILL	0.194	20.9	77.8	-0.102	-40542	2020199	0.425	-39713	83275	43561	1.97*	14469	98163	112632	0.00	0.00	0.00
NO.05 SAW MILL	0.000	0.0	0.0	91.7	0.000	0	0.000	0	0.000	0	0.000	19914	96292	116206	0.00	0.00	0.00
NO.06 NEWSPRINT MILL	0.000	0.0	0.0	91.4	0.000	0	0.000	0	0.000	0	0.000	43555	74301	117856	0.00	0.00	0.00
NO.07 WRITING PAPER MILL	0.000	0.0	0.0	59.1	0.000	0	0.000	0	0.000	0	0.000	210628	218524	429152	0.00	0.00	0.00
NO.08 CORRUGATED PAPER	0.000	0.0	0.0	205.4	0.000	0	0.000	0	0.000	0	0.000	57664	76864	134528	0.00	0.00	0.00
NO.09 SOFT BOARD	0.000	0.0	0.0	72.5	0.000	0	0.000	0	0.000	0	0.000	120385	540819	661204	0.00	0.00	0.00
NO.10 CHLORINE	0.000	0.0	0.0	499.1	0.000	0	0.000	0	0.000	0	0.000	53194	34273	87467	0.00	0.00	0.00
NO.11 ALUMINA	0.000	0.0	0.0	32.0	0.000	0	0.000	0	0.000	0	0.000	18149	159056	177205	0.00	0.00	0.00
NO.12 LOW DENS. POLYETHYL	0.000	0.0	0.0	148.6	0.000	0	0.000	0	0.000	0	0.000	-28119	57565	29446	10.31	0.00	0.00
NO.13 HI DENS. POLYETHYL	0.178	13.6	53.7	0.135	37895	782391	0.401	-41242	78782	37540	8.55*	10056	4463	14519	0.00	0.00	0.00
NO.14 POLYVINYL CHLORIDE	0.129	14.7	73.7	0.067	28388	1344795	0.348	-41242	78782	37540	8.55*	5833	22168	28001	0.00	0.00	0.00
NO.15 STYRENE-BUT. RUB.	0.000	0.0	0.0	4.2	0.000	0	0.000	0	0.000	0	0.000	104155	7532	111687	0.00	0.00	0.00
NO.16 NYLON	0.000	0.0	0.0	20.7	0.000	0	0.000	0	0.000	0	0.000	780461	16628	797068	0.00	0.00	0.00
NO.17 STYRENE	0.000	0.0	0.0	7.0	0.000	0	0.000	0	0.000	0	0.000	2670494	313958	2984452	0.00	0.00	0.00
NO.18 ETHYLENE	0.000	0.0	0.0	16.2	0.000	0	0.000	0	0.000	0	0.000	-27152	59693	32541	7.34*	0.00	0.00
NO.19 PETROLEUM REFINING	0.000	0.0	0.0	293.3	0.000	0	0.000	0	0.000	0	0.000	4342768	521814	4864582	0.00	0.00	0.00
NO.20 TIRES	0.161	17.6	55.8	0.142	57609	1173995	0.334	-40857	89446	47590	5.80*	56215	79390	135605	0.00	0.00	0.00
NO.23 INTEGRATED STEEL	0.000	0.0	0.0	437.4	0.000	0	0.000	0	0.000	0	0.000	1502459	103125	103125	0.00	0.00	0.00
NO.24 GRAY IRON FOUNDRY	0.000	0.0	0.0	74.2	0.000	0	0.000	0	0.000	0	0.000	100465	100465	54390	10.60	0.00	0.00
NO.25 COPPER	0.162	26.0	82.6	0.175	103125	1502459	0.334	-40857	89446	47590	5.80*	56215	79390	135605	0.00	0.00	0.00
NO.26 MOTOR VEHICLE	0.141	29.4	93.8	0.096	72464	1822803	0.339	-46075	100465	54390	10.60	8363909	2820844	11184755	0.00	0.00	0.00
TOTAL - ALL		122	2623			8546646						8363909	2820844	11184755			
FUEL SAVINGS CASES ONLY		122	437			8546646						-223158	468225	245068			
COST SAVINGS CASES ONLY		101	360			6626447						-183444	334951	201507			
EMISSIONS & SAVINGS CASE ONLY		0	2186			0						8537068	2352620	1093890			
FUEL & COST SAVINGS CASES		101	360			6626447						-183444	334951	201507			
FUEL, COST & EMISSIONS SAVINGS		0	0			0						0	0	0			

YEAR : 1990
 10.25 ADVANCED TECHNOLOGY, COMBINED CYCLE, DIRECT FIRED COAL (PFB) *** STRATEGY HEAT PUMP 07
 NATIONAL SUMMARY

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL	SAVINGS	COST SAVINGS		CAPITAL COST	DOLLARS \$000	EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	PLANT	TONS PER YEAR	TOTAL
TOTAL -- ALL	329	9018			726052	23642672		22215696	9794864	32010576
FUEL SAVINGS CASES ONLY	329	1255			726052	23642672		-653235	1343588	690354
COST SAVINGS CASES ONLY	289	1106			803763	19770336		-577112	1183967	606855
EMISSIONS SAVINGS CASE ONLY	0	7763			0	0		22668944	8451280	31320240
FUEL & COST SAVINGS CASES	289	1106			803763	19770336		-577112	1183967	606855
FUEL, COST & EMISSION SAVING	0	0			0	0		0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU	COAL DERIVED	TOTAL FUEL
	NATURAL GAS	PETROLEUM	10**12 BTU	COAL DERIVED	TOTAL FUEL
TOTAL -- ALL	14808	0	6082	0	13841
FUEL SAVINGS CASES ONLY	430	0	143	0	-324
COST SAVINGS CASES ONLY	430	0	126	0	-324
EMISSIONS SAVINGS CASE ONLY	14360	0	5939	0	14165
FUEL & COST SAVINGS CASES	430	0	126	0	-324
FUEL, COST & EMISSION SAVING	0	0	0	0	0

SITE PLUS UTILITY

CATEGORY	FUEL SAVINGS		10**12 BTU	COAL DERIVED	TOTAL FUEL
	NATURAL GAS	PETROLEUM	10**12 BTU	COAL DERIVED	TOTAL FUEL
TOTAL -- ALL	14808	0	6082	0	13841
FUEL SAVINGS CASES ONLY	430	0	143	0	-324
COST SAVINGS CASES ONLY	430	0	126	0	-324
EMISSIONS SAVINGS CASE ONLY	14360	0	5939	0	14165
FUEL & COST SAVINGS CASES	430	0	126	0	-324
FUEL, COST & EMISSION SAVING	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

CATEGORY	FUEL SAVINGS		10**12 BTU	COAL DERIVED	TOTAL FUEL
	NATURAL GAS	PETROLEUM	10**12 BTU	COAL DERIVED	TOTAL FUEL
TOTAL -- ALL	14808	0	6082	0	13841
FUEL SAVINGS CASES ONLY	430	0	143	0	-324
COST SAVINGS CASES ONLY	430	0	126	0	-324
EMISSIONS SAVINGS CASE ONLY	14360	0	5939	0	14165
FUEL & COST SAVINGS CASES	430	0	126	0	-324
FUEL, COST & EMISSION SAVING	0	0	0	0	0

Power Systems Division

FCR-1333

INDUSTRY	CIAS GENERAL SUMMARY - PROCESS LEVEL				NO. 26 ADVANCED TECHNOLOGY COMBINED CYCLE, INDIRECT FIRED, COAL (AFD)				*** STRATEGY HEAT PUMP				EMISSIONS SAVINGS				01 ECS SIZE (MM)
	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS	SAVINGS RATIO	FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY SAVINGS	SAVINGS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT SAVINGS RATIO	UTILITY SAVINGS RATIO	PLANT SAVINGS RATIO	UTILITY SAVINGS RATIO	EMISSIONS SAVINGS RATIO	EMISSIONS SAVINGS RATIO	
NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0	0.000	0	0.000	37327	51337	80665	0.00			
NO. 02 BAKING	0.031	1.3	15.7	-0.489	-69822			0.238	688398	0.238	-11239	16766	5547	0.18*			
NO. 03 DIAL BEVERAGE	0.000	0.0	10.9	0.000	0	0	0	0.000	0	0.000	35301	20256	55558	0.00			
NO. 04 MOVEN FAIRIC MILL	-0.034	-3.6	77.0	-0.299	-118437			0.204	2296162	0.204	-62315	83275	20959	2.05*			
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0	0.000	0	0.000	14469	98163	112632	0.00			
NO. 06 NEWSPRINT MILL	0.000	0.0	91.4	0.000	0	0	0	0.000	0	0.000	19914	96292	116206	0.00			
NO. 07 WRITING PAPER MILL	0.166	18.5	59.1	0.214	104562			0.305	1101040	0.305	-38335	74301	35966	21.83			
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0	0.000	0	0.000	218628	218524	429152	0.00			
NO. 09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0	0.000	0	0.000	57664	76864	134528	0.00			
NO. 10 CHLORINE	0.000	0.0	499.1	0.000	0	0	0	0.000	0	0.000	120385	540819	661204	0.00			
NO. 11 ALUMINA	-0.004	-0.5	32.0	0.084	37012			0.096	553281	0.096	-25918	34273	8355	1.19			
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	148.6	0.000	0	0	0	0.000	0	0.000	18149	159056	17205	0.00			
NO. 13 HI DENS. POLYETHYL	-0.055	-4.2	53.7	-0.024	-6669			0.177	861350	0.177	-44578	57565	12987	10.63			
NO. 14 POLYVINYL CHLORIDE	0.133	15.3	73.7	0.126	53211			0.306	1197263	0.306	-45777	78782	33005	6.97*			
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0	0.000	0	0.000	10056	4463	14519	0.00			
NO. 16 NYLON	-0.010	-0.5	20.7	-0.056	-5985			0.210	389142	0.210	-16275	22168	5893	4.21*			
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0	0.000	0	0.000	104155	7532	111687	0.00			
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0	0.000	0	0.000	780461	16628	797088	0.00			
NO. 19 PETROLEUM REFINING	0.000	0.0	293.3	0.000	0	0	0	0.000	0	0.000	2670494	313958	2984452	0.00			
NO. 20 TIRES	0.112	12.2	55.8	0.095	38377			0.258	1275158	0.258	-34576	59693	25117	7.71*			
NO. 23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0	0	0.000	0	0.000	4342768	521814	4864582	0.00			
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0	0.000	0	0.000	56215	79390	135605	0.00			
NO. 25 COPPER	0.113	18.1	82.6	0.130	76726			0.257	1630136	0.257	-51843	88446	36603	6.09*			
NO. 26 MOTOR VEHICLE	0.098	20.5	93.0	0.057	43524			0.262	1960487	0.262	-50512	100465	41953	11.14			
TOTAL -- ALL		77	2623		152473				12152454		8088616	2820844	10909464				
FUEL SAVINGS CASES ONLY		66	361		246570				8052402		-240281	418473	178192				
COST SAVINGS CASES ONLY		84	397		353412				7717365		-254960	435960	181000				
EMISSIONS SAVINGS CASES ONLY		0	2033		0				0		8477985	2205093	10693031				
FUEL & COST SAVINGS CASES		65	365		316400				7164084		-229042	401637	172644				
FUEL, COST & EMISSIONS SAVING		0	0		0				0		0	0	0				

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.26 ADVANCED TECHNOLOGY, COMBINED CYCLE, INDIRECT FIRED, COAL (AFB)

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS TONS PER YEAR	TOTAL
TOTAL -- ALL	422	9010	2113459	49438944	19874096	29668960
FUEL SAVINGS CASES ONLY	456	1746	2006779	33939712	-1113011	2032834
COST SAVINGS CASES ONLY	449	2047	2524094	37969424	-1360008	2355771
EMISSIONS SAVINGS CASE ONLY	0	6467	0	0	21642176	6899254
FUEL & COST SAVINGS CASES	454	1716	2140615	32236816	-1091468	2000660
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS --- 10**12 BTU ---				TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE FUEL	COAL DISTILLATE BOILER FUEL	OTHER SAVINGS	
TOTAL -- ALL	14779	-408	6082	0	11409
FUEL SAVINGS CASES ONLY	590	0	454	0	-647
COST SAVINGS CASES ONLY	1014	-408	845	0	-1048
EMISSIONS SAVINGS CASE ONLY	13685	0	5185	0	12647
FUEL & COST SAVINGS CASES	590	0	449	0	-631
FUEL, COST & EMISSION SAVING	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14779	-408	6082	0	11409	2197	422
FUEL SAVINGS CASES ONLY	590	0	454	0	-647	59	456
COST SAVINGS CASES ONLY	1014	-408	845	0	-1048	46	449
EMISSIONS SAVINGS CASE ONLY	13685	0	5185	0	12647	2122	0
FUEL & COST SAVINGS CASES	590	0	449	0	-631	46	454
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14779	-408	6082	0	11409	2197	422
FUEL SAVINGS CASES ONLY	590	0	454	0	-647	59	456
COST SAVINGS CASES ONLY	1014	-408	845	0	-1048	46	449
EMISSIONS SAVINGS CASE ONLY	13685	0	5185	0	12647	2122	0
FUEL & COST SAVINGS CASES	590	0	449	0	-631	46	454
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 27 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP., PETROLEUM DISTILLATE			FUEL ENERGY TOTAL			FUEL SAVINGS			FUEL SAVINGS		
	SAVINGS RATIO	FUEL SAVINGS	TOTAL FUEL	SAVINGS RATIO	UTILITY FUEL	COST DOLLARS \$000	SAVINGS RATIO	UTILITY FUEL	COST DOLLARS \$000	SAVINGS RATIO	UTILITY FUEL	COST DOLLARS \$000
NO. 01 MEAT PACKING	0.000	0.0	40.0	0.000	0	0.000	0	0.000	33502	51337	84839	0.00
NO. 02 BAKING	0.178	7.1	15.7	-0.167	-26646	0.994	224723	0.994	5692	16786	22478	0.21*
NO. 03 MALT BEVERAGE	0.145	10.3	18.9	-0.247	-65140	0.991	518514	0.991	31214	20256	51470	3.99
NO. 04 WOVEN FABRIC MILL	0.000	0.0	77.8	0.000	0	0.000	0	0.000	17273	83274	100548	0.00
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	0	0.000	12986	98163	111149	0.00
NO. 06 NEWSPRINT MILL	0.230	27.6	91.4	-0.082	-35625	0.965	480632	0.965	13922	96292	110214	75.69
NO. 07 WRITING PAPER MILL	0.214	23.9	59.1	-0.095	-46384	0.960	627236	0.960	34585	74301	108886	28.48
NO. 08 CORRUGATED PAPER	0.222	112.1	205.4	-0.092	-172593	0.992	2439443	0.992	185909	218524	404432	97.94
NO. 09 BOX BOARD	0.242	37.6	72.5	-0.067	-38695	0.993	742878	0.993	50823	76864	127687	69.88
NO. 10 CHLORINE	0.237	158.3	499.1	-0.054	-135062	0.921	2478244	0.921	57010	540819	597829	45.20
NO. 11 ALUMINA	0.010	1.1	32.0	-0.118	-52003	0.404	247102	0.404	-113	34273	34160	19.15
NO. 12 LOW DENS. POLYETHYL	0.106	18.4	148.6	-0.287	-183595	0.993	909428	0.993	15040	159056	174096	21.74
NO. 13 HI DENS. POLYETHYL	-0.033	-2.5	53.7	-0.477	-133916	0.991	487696	0.991	13677	57565	71242	15.34
NO. 14 POLYVINYL CHLORIDE	-0.081	-9.4	73.7	-0.544	-230092	0.991	787502	0.991	25103	78782	103885	12.59
NO. 15 STYRENE-EUT. RUB.	0.108	2.0	4.2	-0.082	-5955	0.517	68807	0.517	2626	4463	7090	2.61
NO. 16 NYLON	0.000	0.0	20.7	0.000	0	0.000	0	0.000	5235	22168	27403	0.00
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	0	0.000	93480	7532	101012	0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	0	0.000	700469	16628	717096	0.00
NO. 19 PETROLEUM REFINING	0.043	174.4	293.3	-0.019	-284238	0.147	3292146	0.147	85334	313958	399292	26.18
NO. 20 TIRES	0.134	14.6	55.8	-0.108	-43762	0.692	466992	0.692	5058	59693	64750	7.26
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0.000	0	0.000	4342768	521814	4864582	0.00
NO. 24 GRAY IRON FOUNDRY	0.003	12.9	74.2	-0.129	-72071	0.611	411046	0.611	6	79390	79396	17.21
NO. 25 COPPER	0.135	21.6	82.6	-0.098	-57353	0.695	566096	0.695	6799	88446	95446	5.74
NO. 26 MOTOR VEHICLE	0.117	24.4	93.0	-0.139	-105292	0.702	761024	0.702	7738	100465	108203	10.48

TOTAL - ALL		634	2623				15529506			2820844	8566978	
FUEL SAVINGS CASES ONLY		646	1747				14254300			501642	1683584	2385227
COST SAVINGS CASES ONLY		0	0			0	0		0	0	0	0
EMISSIONS SAVINGS CASE ONLY		633	2591				15292405			5746244	2786571	8532810
FUEL & COST SAVINGS CASES		0	0			0	0		0	0	0	0
FUEL, COST & EMISSIONS SAVINGS		0	0			0	0		0	0	0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.27 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP., PETROLEUM DISTILLATE

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS 10**12 BTU 10**12 BTU		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
TOTAL -- ALL	2303	9018			-6961477		61054416		16325882	9794864
FUEL SAVINGS CASES ONLY	2362	6830			-5144464		54689040		2177412	7457989
COST SAVINGS CASES ONLY	0	0			0		0		0	0
EMISSIONS SAVINGS CASE ONLY	2291	6687			-6422670		58494176		16327055	9439754
FUEL & COST SAVINGS CASES	0	0			0		0		0	0
FUEL, COST & EMISSION SAVING	0	0			0		0		0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED 10**12 BTU		TOTAL FUEL SAVINGS	
NATURAL GAS	14780	-9561	0	0	15579	2303
PETROLEUM	5956	-8546	0	0	8164	2362
DISTILLATE	0	0	0	0	0	0
BOILER FUEL	14357	-8817	0	0	15247	2291
EMISSION SAVING	0	0	0	0	0	0

SITE PLUS UTILITY

TOTAL -- ALL	14780	-9561	-1990	0	0	15579	2303
FUEL SAVINGS CASES ONLY	5956	-8546	-4672	0	0	8164	2362
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14357	-8817	-1991	0	0	15247	2291
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14780	-9561	-1990	0	0	15579	2303
FUEL SAVINGS CASES ONLY	5956	-8546	-4672	0	0	8164	2362
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14357	-8817	-1991	0	0	15247	2291
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL																						
INDUSTRY	NO. 28 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP. COAL DERIVED DIST					*** STRATEGY HEAT PUMP				EMISSIONS SAVINGS				01								
	FUEL SAVINGS RATIO	ENERGY TOTAL	UTILITY FUEL SAVINGS	COAL DERIVED DIST	SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	SAVINGS PER YEAR	TONS PER YEAR	UTILITY TOTAL	SAVINGS TOTAL	EMISSIONS TOTAL	SAVINGS TOTAL	EMISSIONS TOTAL	SAVINGS TOTAL	EMISSIONS TOTAL	SAVINGS TOTAL	EMISSIONS TOTAL	SAVINGS TOTAL	EMISSIONS TOTAL	
NO. 01 MEAT PACKING	0.000	0.0	43.0	0.000	0	0	0.000	37327	51337	86665	0.00											
NO. 02 BAKING	0.142	5.0	15.7	-0.299	-42696	314776	0.735	323	16786	17109	0.22*											
NO. 03 MALT BEVERAGE	0.099	7.1	18.9	-0.366	-96462	672935	0.640	15297	20256	35553	4.20											
NO. 04 MOVEN FABRIC MILL	0.165	17.8	77.8	-0.300	-119102	909204	0.725	-8956	83274	74319	2.19											
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00											
NO. 06 NEWSRINT MILL	0.103	22.0	91.4	-0.194	-84689	662882	0.715	-13255	96292	83037	80.33											
NO. 07 WRITING PAPER MILL	0.172	19.2	59.1	-0.198	-97018	836874	0.683	6240	74301	80541	30.06											
NO. 08 CORRUGATED PAPER	0.197	94.4	205.4	-0.186	-349850	3283241	0.692	78532	218524	297056	68.15											
NO. 09 BOX BOARD	0.200	30.9	72.5	-0.170	-97583	987701	0.705	17971	76864	94835	73.72											
NO. 10 CHLORINE	0.250	167.0	499.1	-0.110	-273649	3336273	0.752	-43766	540818	497052	46.47											
NO. 11 ALUMINA	-0.006	-0.7	32.0	-0.270	-119278	512447	0.441	4287	34273	38560	36.66											
NO. 12 LOW DENS. POLYETHYL	0.140	24.5	148.6	-0.277	-177011	1018665	0.727	-30305	159056	128751	18.91											
NO. 13 HI DENS. POLYETHYL	0.134	10.3	53.7	-0.197	-55413	389165	0.608	-12881	57565	44684	9.43											
NO. 14 POLYVINYL CHLORIDE	0.126	14.5	73.7	-0.189	-79726	579145	0.573	-16949	78782	61833	6.90											
NO. 15 STYRENE-BUT. RUB.	0.089	1.7	4.2	-0.134	-9692	86428	0.355	691	4463	5154	2.75											
NO. 16 NYLON	0.145	4.2	20.7	-0.271	-28914	188858	0.711	-2272	22168	19896	4.71											
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00											
NO. 18 ETHYLENE	0.026	30.5	16.2	-0.024	-96922	821975	0.034	10829	16628	27457	9.74											
NO. 19 PETROLEUM REFINING	0.065	263.7	293.3	0.007	100822	3060979	0.113	23266	313958	337225	19.26											
NO. 20 TIRES	0.132	14.4	55.8	-0.326	-131968	952104	0.685	7103	59693	66795	12.18											
NO. 23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00											
NO. 24 GRAY IRON FOUNDRY	0.003	12.9	74.2	-0.162	-90391	544120	0.435	-20359	79390	59032	17.21											
NO. 25 COPPER	0.176	28.2	82.6	-0.231	-136001	1086825	0.701	11440	88446	99886	8.73											
NO. 26 MOTOR VEHICLE	0.143	29.9	93.8	-0.284	-215397	1513610	0.699	11588	100465	112053	16.54											
TOTAL -- ALL		798	2623		-2200931	21759064		4537541	2820843	7356386												
FUEL SAVINGS CASES ONLY		799	1957		-2031654	21245816		34537	2107725	2142260												
COAL SAVINGS CASES ONLY		264	293		100822	3060979		23266	313958	337225												
EMISSIONS SAVINGS CASE ONLY		525	1554		-1292043	14129792		4666234	1703503	6369708												
FUEL & COAL SAVINGS CASES		264	293		100822	3060979		23266	313958	337225												
FUEL, COAL & EMISSIONS SAVING		264	293		100822	3060979		23266	313958	337225												

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.28 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP, COAL DERIVED DIST

*** STRATEGY HEAT PUMP

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CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
	-----					PLANT	UTILITY	TOTAL
TOTAL -- ALL	2718	9018		-10240172	87256112	8883442	9794864	18678304
FUEL SAVINGS CASES ONLY	2724	7460		-9004320	81946608	47813	8126386	8174195
COST SAVINGS CASES ONLY	505	562		193257	5667124	44597	601799	646396
EMISSIONS SAVINGS CASE ONLY	1699	4911		-6327253	56679344	9541447	5300289	14841740
FUEL & COST SAVINGS CASES	505	562		193257	5667124	44597	601799	646396
FUEL, COST & EMISSION SAVING	505	562		193257	5867124	44597	601799	646396

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		BOILER FUEL	COAL FUEL	OTHER SAVINGS	TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM GAS	COAL				
SITE PLUS UTILITY								
TOTAL -- ALL	14775	-425	6082	0	-10358	15365	2197	2718
FUEL SAVINGS CASES ONLY	12401	-17	4939	0	-9608	15365	1497	2724
COST SAVINGS CASES ONLY	3782	0	1794	0	-552	-6778	1309	505
EMISSIONS SAVINGS CASE ONLY	14169	-425	5748	0	-6171	10955	2069	1699
FUEL & COST SAVINGS CASES	3782	0	1794	0	-552	-6778	1309	505
FUEL, COST & EMISSION SAVING	3782	0	1794	0	-552	-6778	1309	505
INCLUDING COAL FUEL CONVERSION								
TOTAL -- ALL	1951	0	747	0	0	0	2197	-706
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	1497	-554
COST SAVINGS CASES ONLY	0	0	0	0	0	0	1309	-246
EMISSIONS SAVINGS CASE ONLY	1951	0	747	0	0	0	2069	-125
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	1309	-246
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	1309	-246

CTAS GENERAL SUMMARY - PROCESS LEVEL										
NO.29 ADVANCED TECHNOLOGY,FUEL CELL,HIGH TEMP.,PETROLEUM DIST.										
INDUSTRY	FUEL ENERGY TOTAL		UTILITY FUEL		COST SAVINGS		*** STRATEGY HEAT PUMP		EMISSIONS SAVINGS	
	SAVINGS	FUEL	SAVINGS	FUEL	DOLLARS \$000	RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY	TONS PER YEAR TOTAL
NO.01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0	0.000	33502	51337 84839 0.00
NO.02 BAKING	0.226	9.0	15.7	-0.180	-25774	293986	0.792	1124	16786	17910 0.23*
NO.03 MALT BEVERAGE	0.203	14.5	18.9	-0.185	-48767	532393	0.689	15510	20256	35766 3.65
NO.04 MOVEN FABRIC MILL	0.272	29.3	77.8	-0.062	-24546	648615	0.709	-11952	83274	71322 1.98
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0	0.000	12986	99163 111149 0.00
NO.06 NEWSPRINT MILL	0.351	42.1	91.4	0.021	9049	590757	0.800	-4948	96292	91364 83.20
NO.07 WRITING PAPER MILL	0.326	36.3	59.1	-0.006	-3124	771846	0.769	12852	74301	87153 31.91
NO.08 CORRUGATED PAPER	0.268	135.5	205.4	-0.044	-83272	2494479	0.732	79874	218524	298397 90.29
NO.09 ECK BOARD	0.283	43.9	72.5	-0.028	-16111	764313	0.746	19118	76864	95983 64.82
NO.10 CHLORINE	0.355	237.6	499.1	0.048	120072	3080034	0.774	-38597	540819	502221 48.79
NO.11 ALUMINA	0.060	6.7	32.0	-0.079	-35009	296612	0.320	-7208	34273	27066 20.84
NO.12 LOW DENS. POLYETHYL	0.319	55.6	148.6	-0.017	-10715	873860	0.775	-23144	159056	135912 18.62
NO.13 HI DENS. POLYETHYL	0.271	20.7	53.7	-0.022	-6242	357266	0.691	-7894	57565	49671 9.73
NO.14 POLYVINYL CHLORIDE	0.253	29.1	73.7	-0.026	-10980	532391	0.655	-10096	78782	68686 7.12
NO.15 STYRENE-BUT. RUB.	0.137	2.6	4.2	-0.074	-5333	76892	0.413	1210	4463	5673 2.73
NO.16 NYLON	0.281	8.1	20.7	-0.022	-2305	143149	0.708	-2767	22168	19401 4.14
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	93480	7532	101012 0.00
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	700469	16628	717096 0.00
NO.19 PETROLEUM REFINING	0.056	229.7	293.3	-0.008	-120199	3826854	0.118	7067	313958	321026 29.21
NO.20 TILES	0.215	23.5	55.3	-0.052	-20934	589905	0.574	-5968	59693	53724 7.92
NO.23 INTEGRATED STEEL	0.000	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582 0.00
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	50453	79390	129844 0.00
NO.25 COPPER	0.217	34.8	82.6	-0.035	-20018	719704	0.576	-9496	88446	78950 6.21
NO.26 MOTOR VEHICLE	0.129	39.3	93.8	-0.009	-66949	933059	0.583	-10677	100465	89788 11.43
<hr/>										
TOTAL -- ALL		993	2623		-371856	17566096		5237662	2820844	8058507
FUEL SAVINGS CASES ONLY		993	1693		-371856	17536096		4007	2045931	2049937
COST SAVINGS CASES ONLY		280	591		129121	3680791		-43545	637110	593565
EMISSIONS SAVINGS CASE ONLY		471	1394		-302590	8760761		5370412	1500016	6870428
FUEL & COST SAVINGS CASES		280	591		129121	3680791		-43545	637110	593565
FUEL,COST & EMISSION SAVING		0	0		0	0		0	0	0

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 29 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP., PETROLEUM DIST.

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*** STRATEGY HEAT PUMP

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
					----- TONS PER YEAR -----		
TOTAL -- ALL	3802	9018	-1220415	67983056	14127404	9794862	23922272
FUEL SAVINGS CASES ONLY	3802	7530	-1220415	67983056	123244	8206733	8329980
COST SAVINGS CASES ONLY	1160	2482	404596	15729952	-160354	2647517	2487165
EMISSIONS SAVINGS CASE ONLY	1770	4151	-551853	34031952	14651048	4593990	19245040
FUEL & COST SAVINGS CASES	1160	2482	404596	15729952	-160354	2647517	2487165
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	

SITE PLUS UTILITY

TOTAL -- ALL	14775	-8134	-1901	0	0	0	15579	2197	3802
FUEL SAVINGS CASES ONLY	6074	-8134	-4503	0	0	0	8946	1419	3802
COST SAVINGS CASES ONLY	280	-2017	111	0	0	0	2786	0	1160
EMISSIONS SAVINGS CASE ONLY	13553	-3876	-1530	0	0	0	10216	2121	1770
FUEL & COST SAVINGS CASES	280	-2017	111	0	0	0	2786	0	1160
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14775	-8134	-1901	0	0	0	15579	2197	3802
FUEL SAVINGS CASES ONLY	6074	-8134	-4503	0	0	0	8946	1419	3802
COST SAVINGS CASES ONLY	280	-2017	111	0	0	0	2786	0	1160
EMISSIONS SAVINGS CASE ONLY	13553	-3876	-1530	0	0	0	10216	2121	1770
FUEL & COST SAVINGS CASES	280	-2017	111	0	0	0	2786	0	1160
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 30 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP, COAL DER. DIST.									
INDUSTRY	FUEL SAVINGS RATIO	ENERGY TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST DER. DIST. RATIO	SAVINGS DOLLARS \$000	*** STRATEGY HEAT PUMP		EMISSIONS SAVINGS	
						CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	TONS PER YEAR PLANT UTILITY	ECs SIZE (MW)
								TOTAL	
NO. 01 MEAT PACKING	0.000	0.0	49.0	0.000	0	0	0.000	37327	88665 0.00
NO. 02 BAKING	0.245	9.8	15.7	-0.050	-7203	150351	0.776	1278	16064 0.17*
NO. 03 MALT BEVERAGE	0.124	8.8	18.9	-0.275	-72387	523630	0.626	14514	34770 4.00
NO. 04 MOVEN FABRIC MILL	0.245	26.4	77.8	-0.062	-24451	572176	0.653	-16366	66509 1.97
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	112632 0.00
NO. 06 NEWSPRINT MILL	0.319	30.3	91.4	0.016	6770	517836	0.744	-9785	86507 82.09
NO. 07 WRITING PAPER MILL	0.300	33.4	59.1	-0.004	-2167	680186	0.713	9717	84018 31.16
NO. 08 CORRUGATED PAPER	0.216	109.1	205.4	-0.098	-183597	2392868	0.683	74373	292897 96.56
NO. 09 BOX BOARD	0.223	34.6	72.5	-0.091	-52193	739159	0.694	16457	93321 70.08
NO. 10 CHLORINE	0.322	215.6	499.1	0.039	96167	2715013	0.718	-65800	475019 48.54
NO. 11 ALUMINA	0.045	5.0	32.0	-0.083	-36766	266138	0.281	-9724	24550 20.75
NO. 12 LOW DENS. POLYETHYL	0.284	49.5	149.6	-0.024	-15436	759818	0.717	-32043	127014 18.50
NO. 13 HI DENS. POLYETHYL	0.241	18.5	53.7	-0.028	-7924	313530	0.632	-11117	57565 46448 9.67
NO. 14 POLYVINYL CHLORIDE	0.373	43.0	73.7	0.119	50368	381822	0.745	1627	80409 6.63
NO. 15 STYRENE-BUT. RUB.	0.150	2.8	4.2	-0.042	-3008	74169	0.372	932	5396 2.85
NO. 16 NYLON	0.250	7.2	20.7	-0.029	-3135	126824	0.649	-3986	18182 4.12
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	111687 0.00
NO. 18 ETHYLENE	0.028	33.4	16.2	-0.019	-79076	726617	0.037	12995	29623 10.16
NO. 19 PETROLEUM REFINING	0.053	216.1	293.3	-0.008	-115306	3441855	0.102	-9160	313958 304798 28.62
NO. 20 TIRES	0.317	34.7	55.8	0.073	29617	455966	0.651	3715	55693 63407 7.36
NO. 23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0	0.000	4342768	521814 4864582 0.00
NO. 24 GRAY IRON FOUNDRY	0.164	15.4	74.2	-0.029	-16246	403475	0.457	-17484	78390 61906 17.21
NO. 25 COPPER	0.320	51.2	82.6	0.026	50640	552339	0.654	4737	88446 93184 5.81
NO. 26 MAJOR VEHICLE	0.277	57.9	93.0	0.023	17642	759954	0.661	5415	100465 105820 10.62
TOTAL -- ALL		1021	2623		-367760	16564743		4469014	2820243 7289959
FUEL SAVINGS CASES ONLY		1021	1909		-367760	16564743		-29703	2141998 2112244
COST SAVINGS CASES ONLY		441	896		251204	5302949		-80091	984496 904405
EMISSIONS SAVINGS CASE ONLY		419	1332		-251353	7443060		4644479	1434053 6078533
FUEL & COST SAVINGS CASES		441	696		251204	5302949		-60091	964486 904405
FUEL, COST & EMISSION SAVING		107	306		148267	2150102		15493	327306 342879

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO.30 ADVANCED TECHNOLOGY,FUEL CELL, HIGH TEMP, COAL DER. DIST.

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	DOLLARS \$000	DOLLARS \$000	\$000	\$000	TONS PER YEAR	TOTAL
---	---	---	---	---	---	---	---	---
TOTAL -- ALL	3663	9018	-1782007	-1782007	66185184	66185184	8770851	18565712
FUEL SAVINGS CASES ONLY	3663	7791	-1782007	-1782007	66185184	66185184	-20363	8461497
COST SAVINGS CASES ONLY	1559	3320	763341	763341	19303104	19303104	-257056	3544134
EMISSIONS SAVINGS CASE ONLY	1935	4284	-1293648	-1293648	35442944	35442944	9473825	4736634
FUEL & COST SAVINGS CASES	1559	3320	763341	763341	19303104	19303104	-257056	3544134
FUEL,COST & EMISSION SAVING	506	838	452394	452394	5500417	5500417	36371	896620
								932991

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	BOILER FUEL	GAS	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
---	---	---	---	---	---	---	---	---
TOTAL -- ALL	14775	-425	-425	6082	0	-8467	-16112	15579
FUEL SAVINGS CASES ONLY	12824	-425	-425	5335	0	-8467	-16112	9210
COST SAVINGS CASES ONLY	651	0	0	328	0	-2765	-447	3746
EMISSIONS SAVINGS CASE ONLY	10071	-17	-17	3595	0	-4601	-0258	10082
FUEL & COST SAVINGS CASES	651	0	0	328	0	-2765	-447	3746
FUEL,COST & EMISSION SAVING	371	0	0	105	0	-769	-208	960

SITE PLUS UTILITY

TOTAL -- ALL	14775	-425	-425	6082	0	-8467	-16112	15579	2197	3063
FUEL SAVINGS CASES ONLY	12824	-425	-425	5335	0	-8467	-16112	9210	1497	3983
COST SAVINGS CASES ONLY	651	0	0	328	0	-2765	-447	3746	46	1559
EMISSIONS SAVINGS CASE ONLY	10071	-17	-17	3595	0	-4601	-0258	10082	780	1885
FUEL & COST SAVINGS CASES	651	0	0	328	0	-2765	-447	3746	46	1559
FUEL,COST & EMISSION SAVING	371	0	0	105	0	-769	-208	960	46	506

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	1951	0	0	747	0	0	0	5802	2197	930
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	-567	1497	930
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	556	46	602
EMISSIONS SAVINGS CASE ONLY	1951	0	0	747	0	0	0	7355	780	1885
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	556	46	602
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	245	46	291

CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO. 31 ADVANCED TECHNOLOGY FUEL CELL/HIGH TEMP.			COAL GASIFIER			STRATEGY HEAT PUMP			EMISSIONS SAVINGS		ECS SIZE (MM)
	FUEL SAVINGS RATIO	ENERGY TOTAL	UTILITY FUEL	SAVINGS RATIO	COST DOLLARS \$000	CAPITAL COST \$000	SAVINGS RATIO	PLANT	TONS PER YEAR	TOTAL		
NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0	0.000	37327	51337	68665	0.00	
NO. 02 BAKING	0.163	6.7	15.7	-0.240	-34207	696137	0.894	4035	16786	20821	0.164	
NO. 03 MILK BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	35301	20256	55558	0.00	
NO. 04 WOVEN FABRIC MILL	0.600	0.0	77.6	0.000	0	0	0.000	19246	63275	102520	0.00	
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	99163	112632	0.00	
NO. 06 MEATSPERRY MILL	0.000	0.0	91.4	0.000	0	0	0.000	19914	96292	116206	0.00	
NO. 07 PULPING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	43555	74301	117856	0.00	
NO. 08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00	
NO. 09 ECK BOARD	0.000	0.0	72.5	0.000	0	0	0.000	57664	76664	134528	0.00	
NO. 10 CHLORINE	0.600	0.0	499.1	0.000	0	0	0.000	120385	540819	661204	0.00	
NO. 11 ALUMINA	0.054	6.0	32.0	0.025	10876	694044	0.451	5144	34273	39418	18.86	
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	149.6	0.000	0	0	0.000	18149	159056	177205	0.00	
NO. 13 HI DENS. POLYETHYL	0.000	0.0	53.7	0.000	0	0	0.000	15943	57565	73508	0.00	
NO. 14 POLYVINYL CHLORIDE	0.222	25.6	73.7	0.125	52950	1576464	0.868	16953	78782	95735	6.964	
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00	
NO. 16 NYLON	0.000	0.0	20.7	0.000	0	0	0.000	5833	22168	28901	0.00	
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00	
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00	
NO. 19 PETROLEUM REFINING	0.054	221.1	293.3	0.026	359965	8173710	0.157	153247	313958	467206	26.27	
NO. 20 TILES	0.202	22.0	55.0	0.036	14765	1555404	0.755	13598	59692	73591	7.174	
NO. 23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	521814	4864592	0.00	
NO. 24 CRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	58215	79390	135605	0.00	
NO. 25 COPPER	0.203	32.6	82.6	0.087	51133	1954537	0.760	19788	88446	108335	5.674	
NO. 26 MOTOR VEHICLE	0.176	36.8	93.9	0.004	3193	2492871	0.767	22425	100465	122890	10.354	
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TOTAL - ALL		351	2823		493675	17143152		6127557	2820844	8948403		
FUEL SAVINGS CASES ONLY		351	647		483675	17143152		235491	672403	927594		
COST SAVINGS CASES ONLY		344	631		522032	16447030		231456	675617	930704		
EMERGENCY SAVINGS CASE ONLY		351	2823		493675	17143152		6127557	2820844	8948403		
FUEL & COST SAVINGS CASES		344	631		522032	16447030		231456	675617	930704		
FUEL & EMISSIONS SAVINGS		344	631		522032	16447030		231456	675617	930704		

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- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1970

NO.31 ADVANCED TECHNOLOGY FUEL CELL-HIGH TEMP., COAL GASIFIER

*** STRATEGY HEAT PUMP

CATEGORY	TOTAL FUEL SAVINGS		UTILITY FUEL		COST SAVINGS		CAPITAL COST		EMISSIONS SAVINGS	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	811	9018			1197939	44267664			17856176	27651056
FUEL SAVINGS CASES ONLY	811	1762			1197939	44267664			553212	2438915
COST SAVINGS CASES ONLY	793	1732			1263556	42933296			545478	2399005
EMISSIONS SAVINGS CASE ONLY	811	9018			1197939	44267664			17856176	27651056
FUEL & COST SAVINGS CASES	798	1732			1263556	42933296			545478	2399005
FUEL, COST & EMISSIONS SAVING	793	1732			1263556	42933296			545478	2399005

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS		10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	GAS	COAL	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14784	-408	6082	0	0	-6915	13194	2197
FUEL SAVINGS CASES ONLY	4577	-403	2301	0	0	-6915	-112	1368
COST SAVINGS CASES ONLY	4577	-403	2296	0	0	-6915	-107	1356
EMISSIONS SAVINGS CASE ONLY	14784	-403	6082	0	0	-6915	13194	2197
FUEL & COST SAVINGS CASES	4577	-403	2296	0	0	-6915	-107	1356
FUEL, COST & EMISSIONS SAVING	4577	-403	2296	0	0	-6915	-107	1356

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	10315	0	3824	0	0	0	12344	2197	556
FUEL SAVINGS CASES ONLY	107	0	43	0	0	0	-962	1368	556
COST SAVINGS CASES ONLY	109	0	37	0	0	0	-957	1356	543
EMISSIONS SAVINGS CASE ONLY	10315	0	3824	0	0	0	12344	2197	556
FUEL & COST SAVINGS CASES	103	0	37	0	0	0	-957	1356	543
FUEL, COST & EMISSIONS SAVING	103	0	37	0	0	0	-957	1356	543

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL												
INDUSTRY	NO.32 ADVANCED TECHNOLOGY STEELING ENGINE			COAL DERIVED COILER GRADE			*** STRATEGY HEAT PUMP		EMISSIONS SAVINGS		01 ECS SIZE (MM)	
	FUEL SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST SAVINGS DOLLARS \$000	EMISSIONS SAVINGS RATIO	CAPITAL COST \$000	TONS PER YEAR		TOTAL			
							PLANT	UTILITY				
NO.01 MEAT PACKING	0.000	0.0	49.0	0.000	0	0	0.000	37327	51337	88665	0.00	
NO.02 BAKING	0.143	5.7	15.7	-0.356	-50048	515391	0.405	-7351	16786	9435	0.24*	
NO.03 MALT BEVERAGE	0.000	0.0	18.9	0.000	0	0	0.000	35301	20256	55558	0.00	
NO.04 KOVEN FABRIC MILL	0.209	22.5	77.8	-0.141	-55909	1011664	0.419	-40367	83275	42908	2.08	
NO.05 SAW MILL	0.000	0.0	91.7	0.000	0	0	0.000	14469	98163	112632	0.00	
NO.06 HENSPOINT MILL	0.282	33.9	91.4	0.017	7369	750985	0.473	-41318	96292	54974	27.08	
NO.07 WRITING PAPER MILL	0.000	0.0	59.1	0.000	0	0	0.000	43555	74301	117856	0.00	
NO.08 CORRUGATED PAPER	0.000	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00	
NO.09 BOX BOARD	0.000	0.0	72.5	0.000	0	0	0.000	57664	76864	134528	0.00	
NO.10 CHLORINE	0.302	202.3	499.1	0.040	98584	4131250	0.484	-220725	540818	320094	25.49	
NO.11 ALUMINA	0.036	3.9	32.0	-0.081	-35928	373329	0.149	-21281	34273	12992	21.83	
NO.12 LOW DENS. POLYETHYL	0.261	45.6	148.6	-0.030	-18939	1164515	0.475	-74914	159056	84142	19.47	
NO.13 HI DENS. POLYETHYL	0.224	17.1	53.7	-0.036	-10015	477126	0.416	-26950	57565	30615	10.16	
NO.14 POLYVINYL CHLORIDE	0.208	24.0	73.7	-0.043	-18015	719352	0.390	-36684	78782	42098	7.44	
NO.15 STYRENE-BUT. RUB.	0.000	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00	
NO.16 NYLON	0.226	6.5	20.7	-0.053	-5646	203296	0.422	-10348	22168	11819	4.35	
NO.17 STYRENE	0.000	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00	
NO.18 ETHYLENE	0.000	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00	
NO.19 PETROLEUM REFINING	0.049	199.3	293.3	-0.013	-193768	5307813	0.059	-138285	313958	175693	20.44	
NO.20 TIRES	0.173	19.4	55.8	-0.073	-29445	768895	0.334	-27139	59693	32553	8.29	
NO.23 INTEGRATED STEEL	0.000	0.0	497.4	0.000	0	0	0.000	4342768	521814	4864582	0.00	
NO.24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0	0.000	56215	79390	135605	0.00	
N.J.25 COPPER	0.179	23.7	82.6	-0.052	-30577	961686	0.334	-40874	88446	47572	6.49	
NO.26 MOTOR VEHICLE	0.155	32.4	93.8	-0.106	-80289	1271459	0.339	-46110	100465	54356	11.96	
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TOTAL -- ALL		641	2623		-423475	17656752		4960270	2020844	7781120		
FUEL SAVINGS CASES ONLY		641	1533		-423475	17656752		-732326	1651574	919251		
COST SAVINGS CASES ONLY		236	591		105953	4682234		-262043	637110	375067		
EMISSIONS SAVINGS CASE ONLY		0	1035		0	0		5692593	1169272	6861871		
FUEL & COST SAVINGS CASES		236	591		105953	4682234		-262043	637110	375067		
FUEL,COST & EMISSION SAVING		0	0		0	0		0	0	0		

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 32 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL DERIVED BOILER GRADE

*** STRATEGY HEAT PUMP

07

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	2049	9018			-1149374	55864560			13874807	9794864 23669680
FUEL SAVINGS CASES ONLY	2049	5459			-1149374	55864560			-2638391	5834849 3196453
COST SAVINGS CASES ONLY	958	2482			331284	20453264			-1110525	2647517 1536993
EMISSIONS SAVINGS CASE ONLY	0	3559			0	0			16513208	3960017 20473216
FUEL & COST SAVINGS CASES	958	2482			331284	20453264			-1110525	2647517 1536993
FUEL, COST & EMISSION SAVING	0	0			0	0			0	0 0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
	NATURAL GAS	PETROLEUM DISTILLATE	PETROLEUM BOILER FUEL	GAS DISTILLATE BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14779	-408	6082	0	-12883	15579 2197 2049
FUEL SAVINGS CASES ONLY	5005	-408	2594	0	-12883	6343 1397 2049
COST SAVINGS CASES ONLY	280	0	223	0	-2330	2786 0 958
EMISSIONS SAVINGS CASE ONLY	9775	0	3488	0	0	9236 799 0
FUEL & COST SAVINGS CASES	280	0	223	0	-2330	2786 0 958
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0 0 0

INCLUDING COAL FUEL CONVERSION

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR	
	10**12 BTU	10**12 BTU	10**12 BTU	10**12 BTU	\$000	\$000	\$000	\$000	PLANT	TOTAL
TOTAL -- ALL	9775	0	3488	0	0	0	0	0	7448	2197 -390
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	-1787	1397 -390
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	175	0 175
EMISSIONS SAVINGS CASE ONLY	9775	0	3488	0	0	0	0	0	9236	799 0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	175	0 175
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0 0

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 33 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL (AFB)									
INDUSTRY	FUEL ENERGY TOTAL		UTILITY		FUEL		SAVINGS		01 ECS SIZE (MM)
	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	TOTAL UTILITY	SAVINGS RATIO	FUEL SAVINGS	SAVINGS RATIO	TOTAL UTILITY	
NO. 01 MEAT PACKING	0.000	0.0	48.0	0.000	0	0.000	0	37327	86665 0.00
NO. 02 BAKING	0.006	1.0	15.7	-0.394	-56210	0.231	-11406	16786	5380 0.24*
NO. 03 MALT BEVERAGE	-0.010	-0.7	18.9	-0.111	-29166	0.058	-17010	20256	3245 2.84
NO. 04 HOVEN FABRIC MILL	0.097	10.4	77.8	-0.082	-32573	0.313	-51221	83275	32054 2.08
NO. 05 SAW MILL	0.000	0.0	91.7	0.000	0	0.000	14469	98163	112632 0.00
NO. 06 NEWSPRINT MILL	0.199	23.7	91.4	0.165	71890	0.308	-51174	96292	45117 28.49
NO. 07 WRITING PAPER MILL	0.177	19.8	59.1	0.153	74843	0.315	-37223	74301	37078 21.59
NO. 08 CORRUGATED PAPER	0.128	64.8	205.4	0.163	305357	0.234	-118180	218524	100344 25.51
NO. 09 BOX BOARD	0.144	22.3	72.5	0.156	89867	0.267	-40929	76864	35935 23.00
NO. 10 CHLORINE	0.215	143.6	499.1	0.193	478426	0.398	-277350	540818	283469 25.51
NO. 11 ALUMINA	-0.003	-0.4	32.0	0.089	39381	0.102	-25391	34273	8883 21.12
NO. 12 LOW DENS. POLYETHYL	0.165	28.8	148.6	0.123	78661	0.385	-90832	159056	68224 19.54
NO. 13 HI DENS. POLYETHYL	0.130	9.9	53.7	0.128	35919	0.327	-33526	57565	24039 10.16
NO. 14 POLYVINYL CHLORIDE	0.116	13.3	73.7	0.127	53510	0.300	-46374	78782	32407 7.42
NO. 15 STYRENE-BUT. RUB.	0.070	1.3	4.2	0.095	6892	0.128	-2608	4463	1855 2.94
NO. 16 NYLON	0.118	3.4	20.7	0.070	7465	0.321	-13173	22168	8995 4.35
NO. 17 STYRENE	0.000	0.0	7.0	0.000	0	0.000	104155	7532	111687 0.00
NO. 18 ETHYLENE	0.000	0.0	16.2	0.000	0	0.000	780461	16628	797088 0.00
NO. 19 PETROLEUM REFINING	0.018	75.4	293.3	0.360	5302725	0.026	-237596	313958	76362 26.69
NO. 20 TIRES	0.100	10.9	55.0	0.115	46658	0.255	-34875	59693	24618 8.17
NO. 23 INTEGRATED STEEL	0.000	0.0	407.4	0.000	0	0.000	4342768	521814	4864582 0.00
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	74.2	0.000	0	0.000	56215	79390	135605 0.00
NO. 25 COPPER	0.083	15.7	82.6	0.143	84281	0.251	-52632	88446	35814 6.42
NO. 26 MOTOR VEHICLE	0.092	19.3	93.8	0.065	49106	0.264	-58222	100465	42243 11.80
TOTAL -- ALL		463	2623		6607029		4135671	2820844	6956521
FUEL SAVINGS CASES ONLY		464	1847		6596315		-1157320	1991452	834135
COST SAVINGS CASES ONLY		452	1786		6724977		-1120083	1925565	805584
EMISSIONS SAVINGS CASE ONLY		0	725		0		5335394	774864	6110258
FUEL & COST SAVINGS CASES		452	1754		6685597		-1094694	1091392	796702
FUEL, COST & EMISSION SAVING		0	0		0		0	0	0

COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARYYEAR : 1990
NO.33 ADVANCED TECHNOLOGY,STIRLING ENGINE,COAL(ATB)

07

*** STRATEGY HEAT PUMP

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
	10**12 BTU	10**12 BTU	UTILITY	FUEL	DOLLARS \$000	DOLLARS \$000	COST \$000	TONS PER YEAR	UTILITY	EMISSIONS SAVINGS	EMISSIONS SAVINGS	TOTAL
TOTAL -- ALL	1855	9018				16477404	112474928	9997045	9794866	19792704		
FUEL SAVINGS CASES ONLY	1860	7162				16125278	105666304	-4359262	7012800	3453532		
COST SAVINGS CASES ONLY	1834	7314				16703490	106132288	-4502294	7976114	3473014		
EMISSIONS SAVINGS CASE ONLY	0	1489				0	0	14652794	1588130	16240927		
FUEL & COST SAVINGS CASES	1838	6982				16295459	101329008	-42339217	7621004	3381780		
FUEL,COST & EMISSION SAVING	0	0				0	0	0	0	0		

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		BOILER FUEL		TOTAL FUEL	
	NATURAL GAS	PETROLEUM	PETROLEUM	COAL	DISTILLATE	BOILER FUEL	COAL FUEL	OTHER SAVINGS
TOTAL -- ALL	14775	-425	6082	0	0	0	-2061	2197
FUEL SAVINGS CASES ONLY	5596	-17	3055	0	0	0	-8183	1410
COST SAVINGS CASES ONLY	6001	-425	3428	0	0	0	-8563	1393
EMISSIONS SAVINGS CASE ONLY	8702	0	2602	0	0	0	6633	777
FUEL & COST SAVINGS CASES	5578	-17	3032	0	0	0	-8148	1393
FUEL,COST & EMISSION SAVING	0	0	0	0	0	0	0	0
INCLUDING COAL FUEL CONVERSION	14775	-425	6082	0	0	0	-2061	2197
TOTAL -- ALL	5596	-17	3055	0	0	0	-8183	1410
FUEL SAVINGS CASES ONLY	6001	-425	3428	0	0	0	-8563	1393
COST SAVINGS CASES ONLY	8702	0	2602	0	0	0	6633	777
EMISSIONS SAVINGS CASE ONLY	5578	-17	3032	0	0	0	-8148	1393
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0
FUEL,COST & EMISSION SAVING								

Power Systems Division

FCR-1333

CTAS GENERAL SUMMARY - PROCESS LEVEL									
NO. 34 ADVANCED TECHNOLOGY, THERMIONICS, COAL									
INDUSTRY	FUEL ENERGY TOTAL		DERIVED BOILER GRADE		CAPITAL COST SAVINGS		STRATEGY HEAT PUMP		ECS SIZE (FW)
	SAVINGS	RATIO	SAVINGS	UTILITY FUEL	SAVINGS	RATIO	COST \$000	EMISSIONS SAVINGS RATIO	PLANT UTILITY
NO. 01 MEAT PACKING	0.000	0.0	0.0	48.0	0.000	0	0	0.000	37327
NO. 02 BAKING	0.000	0.0	0.0	15.7	0.000	0	0	0.000	6501
NO. 03 MALT BEVERAGE	0.000	0.0	0.0	18.9	0.000	0	0	0.000	35301
NO. 04 WOVEN FABRIC MILL	0.000	0.0	0.0	77.8	0.000	0	0	0.000	19246
NO. 05 SAW MILL	0.000	0.0	0.0	91.7	0.000	0	0	0.000	14459
NO. 06 NEWSPRINT MILL	0.000	0.0	0.0	91.4	0.000	0	0	0.000	19914
NO. 07 WRITING PAPER MILL	0.000	0.0	0.0	59.1	0.000	0	0	0.000	43555
NO. 08 CORRUGATED PAPER	0.000	0.0	0.0	205.4	0.000	0	0	0.000	210628
NO. 09 BOX BOARD	0.000	0.0	0.0	72.5	0.000	0	0	0.000	57664
NO. 10 CHLORINE	0.000	0.0	0.0	499.1	0.000	0	0	0.000	120395
NO. 11 ALUMINA	0.000	0.0	0.0	32.0	0.000	0	0	0.000	53194
NO. 12 LOW DENS. POLYETHYL	0.000	0.0	0.0	148.6	0.000	0	0	0.000	18149
NO. 13 HI DENS. POLYETHYL	0.000	0.0	0.0	53.7	0.000	0	0	0.000	15943
NO. 14 POLYVINYL CHLORIDE	0.000	0.0	0.0	73.7	0.000	0	0	0.000	29079
NO. 15 STYRENE-BUT. RUB.	0.000	0.0	0.0	4.2	0.000	0	0	0.000	10056
NO. 16 NYLON	0.000	0.0	0.0	20.7	0.000	0	0	0.000	5833
NO. 17 STYRENE	0.000	0.0	0.0	7.0	0.000	0	0	0.000	104155
NO. 18 ETHYLENE	0.000	0.0	0.0	16.2	0.000	0	0	0.000	780461
NO. 19 PETROLEUM REFINING	0.000	0.0	0.0	293.3	0.000	0	0	0.000	2670494
NO. 20 TIRES	0.000	0.0	0.0	55.8	0.000	0	0	0.000	37757
NO. 23 INTEGRATED STEEL	0.000	0.0	0.0	497.4	0.000	0	0	0.000	4342768
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	0.0	74.2	0.000	0	0	0.000	56215
NO. 25 COPPER	0.000	0.0	0.0	82.6	0.000	0	0	0.000	54050
NO. 26 MOTOR VEHICLE	0.000	0.0	0.0	93.8	0.000	0	0	0.000	59750
TOTAL -- ALL			0	2623		0	0		8802891
FUEL SAVINGS CASES ONLY			0	0		0	0		2820844
COST SAVINGS CASES ONLY			0	0		0	0		0
EMISSIONS SAVINGS CASE ONLY			0	2623		0	0		8802891
FUEL & COST SAVINGS CASES			0	0		0	0		2620844
FUEL, COST & EMISSION SAVING			0	0		0	0		0

07

- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SUMMARY

YEAR : 1990

NO. 34 ADVANCED TECHNOLOGY, THERMIONICS, COAL DERIVED BOILER GRADE

*** STRATEGY HEAT PUMP

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU 10**12 BTU		UTILITY FUEL SAVINGS		COST SAVINGS DOLLARS \$000		CAPITAL COST \$000		EMISSIONS SAVINGS TONS PER YEAR		TOTAL	
TOTAL -- ALL	0	9018	0	0	0	0	0	0	23438048	9794864	33232880	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	9018	0	0	0	0	0	0	23438048	9794864	33232880	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

CATEGORY	FUEL SAVINGS 10**12 BTU		COAL DERIVED		TOTAL FUEL	
TOTAL -- ALL	14870	0	6082	0	15579	2197
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	15579	2197
FUEL & COST SAVINGS CASES	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0

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SITE PLUS UTILITY

TOTAL -- ALL	14870	0	6082	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

INCLUDING COAL FUEL CONVERSION

TOTAL -- ALL	14870	0	6082	0	15579	2197	0
FUEL SAVINGS CASES ONLY	0	0	0	0	0	0	0
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	14870	0	6082	0	15579	2197	0
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

CTAS GENERAL SUMMARY - PROCESS LEVEL																			
NO. 35 ADVANCED TECHNOLOGY, THEMICHICS, COAL																			
INDUSTRY	FUEL ENERGY TOTAL			DER. B.G. (COMP. CONFIG.)			*** STRATEGY HEAT PUMP			EMISSIONS SAVINGS			ECS						
	SAVINGS	FUEL	SAVINGS	UTILITY	COST	SAVINGS	CAPITAL	EMISSIONS	PLANT	UTILITY	SAVINGS	PLANT	UTILITY	SAVINGS	PLANT	UTILITY	SAVINGS	PLANT	UTILITY
	RATIO	SAVINGS	RATIO	SAVINGS	RATIO	SAVINGS	\$000	\$000	\$000	RATIO	\$000	\$000	RATIO	\$000	\$000	RATIO	\$000	\$000	RATIO
NO. 01 HEAT PACKING	0.000	0.0	0.0	48.0	0.000	0	0	0.000	37327	51337	80665	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 02 BAKING	0.000	0.0	0.0	15.7	0.000	0	0	0.000	6501	16786	23287	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 03 MALT BEVERAGE	0.000	0.0	0.0	10.9	0.000	0	0	0.000	35301	20256	55558	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 04 HOVEN FABRIC MILL	-0.533	-57.4	-57.4	77.8	-1.149	-455394	2268369	-0.144	-98079	83274	-14804	2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 05 SAW MILL	0.000	0.0	0.0	91.7	0.000	0	0	0.000	14469	93163	112632	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 06 NEWSPRINT MILL	0.110	13.2	13.2	91.4	-0.124	-54067	886710	0.347	-56021	96292	40271	73.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 07 WRITING PAPER MILL	0.000	0.0	0.0	59.1	0.000	0	0	0.000	43555	74301	117856	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 08 CORRUGATED PAPER	0.000	0.0	0.0	205.4	0.000	0	0	0.000	210628	218524	429152	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 09 BOX BOARD	0.000	0.0	0.0	72.5	0.000	0	0	0.000	57664	76864	134528	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 10 CHLORINE	0.046	30.5	30.5	499.1	-0.217	-539379	5612333	0.294	-346329	540318	194489	50.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 11 ALUMINA	-0.192	-21.4	-21.4	32.0	-0.396	-170819	874654	-0.060	-39558	34273	-5285	39.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 12 LOW DENS. POLYETHYL	-0.167	-29.1	-29.1	148.6	-0.513	-327887	1938496	0.170	-128883	159056	30174	21.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 13 HI DENS. POLYETHYL	-0.254	-19.4	-19.4	53.7	-0.638	-179072	975510	0.058	-53329	57565	4236	13.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 14 POLYVINYL CHLORIDE	-0.300	-34.5	-34.5	73.7	-0.701	-296265	1555941	-0.001	-78877	78782	-95	10.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 15 STYRENE-CUT. RUB.	0.000	0.0	0.0	4.2	0.000	0	0	0.000	10056	4463	14519	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 16 NYLON	-0.313	-9.0	-9.0	20.7	-0.737	-78578	417090	0.020	-21611	22168	557	5.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 17 STYRENE	0.000	0.0	0.0	7.0	0.000	0	0	0.000	104155	7532	111687	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 18 ETHYLENE	0.000	0.0	0.0	16.2	0.000	0	0	0.000	780461	16628	797088	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 19 PETROLEUM REFINING	0.000	0.0	0.0	293.3	0.000	0	0	0.000	2670494	313953	2984452	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 20 TIRES	-0.186	-20.4	-20.4	55.8	-0.642	-260219	1757333	0.039	-55871	59693	3822	13.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 23 INTEGRATED STEEL	0.000	0.0	0.0	487.4	0.000	0	0	0.000	4342768	521814	4864582	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 24 GRAY IRON FOUNDRY	0.000	0.0	0.0	74.2	0.000	0	0	0.000	56215	79390	135605	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 25 COPPER	-0.144	-23.1	-23.1	82.6	-0.525	-308692	2063916	0.071	-78260	88446	10106	9.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO. 26 MOTOR VEHICLE	-0.094	-19.5	-19.5	93.8	-0.516	-390822	2710529	0.105	-83658	100465	16007	18.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL -- ALL		-190	-190	2623		-3061111	21060364		7329116	2820843	10149954								
FUEL SAVINGS CASES ONLY		44	44	591		-593465	6499043		-402350	637110	234760								
COST SAVINGS CASES ONLY		0	0	0		0	0		0	0	0								
EMISSIONS SAVINGS CASE ONLY		0	0	1394		0	0		8369593	1500016	9369610								
FUEL & COST SAVINGS CASES		0	0	0		0	0		0	0	0								
FUEL-COST & EMISSION SAVING		0	0	0		0	0		0	0	0								

**- COGENERATION TECHNOLOGY ALTERNATIVES STUDY -
NATIONAL SURVEY**

YEAR : 1990

NO. 35 ADVANCED TECHNOLOGY, THERMIONICS, COAL DER. B.G. (COMP. CONFIG.)

*** STRATEGY HEAT PUMP

CATEGORY	TOTAL FUEL SAVINGS 10**12 BTU	UTILITY FUEL SAVINGS 10**12 BTU	COST SAVINGS DOLLARS \$000	CAPITAL COST \$000	EMISSIONS SAVINGS		
					PLANT	UTILITY	TOTAL
TOTAL -- ALL	-636	9018	-10841297	75977488	17630016	9794864	27424896
FUEL SAVINGS CASES ONLY	264	2482	-2017157	25502128	-1611579	2647317	1035940
COST SAVINGS CASES ONLY	0	0	0	0	0	0	0
EMISSIONS SAVINGS CASE ONLY	0	4151	0	0	21644496	4593990	26239496
FUEL & COST SAVINGS CASES	0	0	0	0	0	0	0
FUEL, COST & EMISSION SAVING	0	0	0	0	0	0	0

NATIONAL FUEL SAVINGS SUMMARY

[illegible][illegible]

TABLE VI-7
SUMMARY RESULTS
BOTTOMING APPLICATIONS

CTAS GENERAL SUMMARY - PROCESS LEVEL

INDUSTRY NO. 21	GLASS CONTAINER	- SIC 3221				*** STRATEGY OPTIMUM				EMISSIONS SAVINGS TONS PER YEAR	ECS SIZE (MM)
		FUEL ENERGY SAVINGS RATIO	TOTAL FUEL SAVINGS	UTILITY FUEL SAVINGS	COST DOLLARS RATIO	CAPITAL COST \$000	EMISSIONS SAVINGS RATIO	PLANT TOTAL	UTILITY TOTAL		
NO. 35	CONVERSION	0.053	11.4	6.9	0.008	199770	0.047	0	7350	7350	0.34*
NO. 37	SYSTEM	0.064	13.5	9.1	0.018	155972	0.062	0	9703	9703	0.43*

CIAS GENERAL SUMMARY - PROCESS LEVEL
 INDUSTRY NO. 22 CLIENT - DRY - SIC 7241
 ENERGY CONVERSION
 NO. 36
 NO. 37

FUEL ENERGY TOTAL				UTILITY		FUEL		SAVINGS		COST		SAVINGS		STRATEGY OPTIMUM		EMISSIONS SAVINGS		ECS			
SAVINGS				SAVINGS		SAVINGS		SAVINGS		SAVINGS		SAVINGS		SAVINGS		SAVINGS		SAVINGS			
RATIO				RATIO		RATIO		RATIO		RATIO		RATIO		RATIO		RATIO		RATIO			
0.002				13.4		19.2		50493		0.061		50493		466991		0.064		22797		2.91	
0.009				29.3		30.3		65577		0.103		65577		437547		0.101		36002		4.36	

TABLE VI-8
CASES FOR DETAIL REVIEW

TABLE VI - 8
CASES FOR DETAIL REVIEW

<u>Energy Conversion System</u>	<u>Fuel</u>	<u>Industry</u>	<u>Strategy</u> <u>Match Industrial</u> <u>Requirement for:</u>
Current Steam Turbine	Coal-FGD	Corrugated Paper	Electric
Advanced Steam Turbine	Coal-AFB	Corrugated Paper	Maximum Energy Savings
Advanced High Speed Diesel	Coal-Derived Distillate	Textile Mill	Electric
Advanced Low Speed Diesel	Coal-Derived Boiler Fuel	Chlorine	Electric
Advanced Low Speed Diesel	Powdered Coal	Newsprint Mill	Electric
Advanced Gas Turbine	Petroleum Boiler Fuel	Corrugated Paper	Maximum Energy Savings
Advanced Gas Turbine	Coal-Derived Boiler Fuel	Chlorine	Electric
Advanced Gas Turbine	Gasified Coal	Writing Paper	Electric
Advanced Gas Turbine	Coal-PBF	Petroleum Refinery	Maximum Energy Savings
Advanced Gas Turbine	Coal-AFB	Corrugated Paper	Electric
Advanced Closed Cycle Gas Turbine	Coal-AFB	Writing Paper	Electric
Advanced Steam Injected Gas Turbine	Coal-Derived Boiler Fuel	Chlorine	Electric
Advanced Combined Cycle	Coal-Derived Boiler Fuel	Low Density Polyethylene	Electric
Advanced Combined Cycle	Coal-PFB	Newsprint Mill	Electric
Advanced Low-Temperature Fuel Cell	Coal-Derived Distillate	Meat Packing	Electric
Advanced High-Temperature Fuel Cell	Coal-Derived Distillate	Chlorine	Electric
Advanced High-Temperature Fuel Cell	Gasified Coal	Newsprint Mill	Electric
Advanced Stirling Engine	Coal-AFB	Corrugated Paper	Electric
Advanced Thermionic Converter	Coal-Derived Boiler Fuel	Corrugated Paper	Electric
Advanced Organic Rankine Cycle	By-Product Hot Cement Gas		-----

TABLE VI-9
EXTENDED INFORMATION FOR TWENTY CASES

AVERAGE ENERGY REQUIREMENTS

NO. 1 SIC 2011 HEAT PACKING

TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO.28 ADVANCED TECHNOLOGY,FUEL CELL,LOW TEMP,COAL DERIVED DIST

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	3.68	35.60
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	7.63
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	46.16	0.0
COAL DERIVED RESIDUAL	22.25	0.0
COAL	0.0	59.67
OTHER	0.0	2.05
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	72.10	104.95
SOURCE	106.53	104.95
IND BYPRODUCT FUEL (10**12 BTU)		
	0.0	0.0
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	4.46	4.50
(10**12 BTU) FUEL ENERGY	46.16	47.99
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	4.50
(10**12 BTU) FUEL ENERGY	0.0	47.99
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	32.85	0.0
SOURCE	-1.58	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	39.55	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	31.91	0.0
(10**9 CU FT)	34.31	0.0
OIL SAVINGS		
(10**12 BTU)	7.63	0.0
EQUIV. BBLs	1.32	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-43.17	0.0
(10**6 TONS)	-2.00	0.0

SELECTED TECHNOLOGY NON-
COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.313 0.0
-0.015 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.962 0.0

F/U(0) 0.540 1.167

SPECIFIED FUEL/U(0) 0.077 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

2.0 0.0

ECS SIZE (MW)

4.28 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-ETA

0.330 0.0

SENSIBLE WASTE HEAT RATIO--A

0.900 0.0

AVBL WASTE HEAT RATIO,R'--HG
(NON ADDITIVE)

0.0 0.0

AVBL WASTE HEAT RATIO,R'--700

0.0 0.0

AVBL WASTE HEAT RATIO,R'--500

0.125 0.0

AVBL WASTE HEAT RATIO,R'--300

0.696 0.0

AVBL WASTE HEAT RATIO,R'--HW

0.124 0.0

TOTAL R

0.946 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R--700

0.0 0.0

RECOV,WASTE HEAT RATIO,R--500

0.0 0.0

RECOV WASTE HEAT RATIO,R--300

0.676 0.0

RECOV WASTE HEAT RATIO,R--HW

0.271 0.0

TOTAL R

0.946 0.0

AUXILIARY POWER REQUIRED(KW)

54. 123.

AUX THERMAL REQ(10⁶ BTU)

1. 0.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITOL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)				
COST CATEGORY	***** SELECTED TECHNOLOGY ***		NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	141.	22.	163.	135.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	141.	22.	163.	135.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	29.	9.	38.	89.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	29.	9.	38.	89.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	2770.	86.	2856.	0.
3.2 PRIMARY GENERATOR/INVERTER	428.	0.	428.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTLING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	342.	0.	342.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	3540.	86.	3626.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	114.	43.	156.	340.
6. HEAT REJECTION	0.	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	40.	40.	6.
7.2 STRUCTURES	41.	0.	41.	61.
7.3 ELECTRICAL CONDITIONING & CONTROL	2.	3.	4.	10.
SUB-TOTAL	43.	43.	86.	77.
8. INDIRECT COSTS				
8.1 CONTINGENCY	774.	40.	814.	128.
8.2 ENGINEERING AND FEES	580.	30.	610.	96.
SUB-TOTAL	1354.	71.	1424.	225.
TOTAL CAPITAL COST ESTIMATE	5221.	272.	5493.	866.
CONSTRUCTION TIME(YEARS)	0.	1.	1.	0.
CAPITAL COST EXPENDITURE	5348.	279.	5627.	870.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	94.	94.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	1634.	0.
COAL DERIVED RESIDUAL	643.	1494.
COAL	0.	0.
OTHER	0.	0.
LINESTONE/DOLOMITE	0.	0.
TOTAL FUEL COST	2371.	1588.

ELECTRICITY
STAND-BY CHARGE
O & M COST

ELECTRICITY	0.	1384.
STAND-BY CHARGE	0.	0.
O & M COST	124.	25.

TOTAL OPERATING COSTS

TOTAL OPERATING COSTS	2495.	2997.
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LEVELIZED OPERATING COSTS

LEVELIZED OPERATING COSTS	2820.	3362.
LEVELIZED FIXED CHARGES	568.	88.
LEVELIZED ANNUAL COST	3388.	3450.
COST SAVINGS	62.	0.
COST SAVINGS RATIO	0.018	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	197.851	188.833
NITROGEN OXIDES	57.892	114.583
HYDROCARBONS	1.972	4.593
PARTICULATES	16.815	22.917
SUBTOTAL	274.530	330.917

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	0.0	255.206
NITROGEN OXIDES	0.0	148.870
HYDROCARBONS	0.0	29.774
PARTICULATES	0.0	21.267
SUBTOTAL	0.0	455.117

TOTAL

TOTAL	274.530	786.033
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EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.554	0.0
NITROGEN OXIDES	0.780	0.0
HYDROCARBONS	0.943	0.0
PARTICULATES	0.619	0.0

TOTAL

TOTAL	0.651	0.0
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SOLID WASTES

SOLID WASTES	0.0	0.0
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ORIGINAL PAGE IS
OF POOR QUALITY

CASE 92 INDUSTRIAL-HEAT PACKING STRATEGY-MATCH-E HONEY-SHIP--INDUSTRIAL
 100.2M ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP, COAL DERIVED DIST

START-UP DATE = 1966.
 BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.3%
 FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%
 GENERAL INFLATION RATE = 0.0%

NUNCOGEN COGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 870. 5627.
 LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 51824. 50352.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION 87. 566.
 NATURAL GAS : ESCALATION RATE = 3.6% 149. 149.
 DISTILLATE : ESCALATION RATE = 1.0% 0. 1843.
 RESIDUAL : ESCALATION RATE = 1.0% 1645. 725.
 COAL : ESCALATION RATE = 1.0% 0. 0.
 COAL GAS & OTHER : ESCALATION RATE = 1.0% 0. 0.
 ELECTRICITY : ESCALATION RATE = 1.0% 1560. 0.
 O&M, INS, ETC. : INFLATION RATE = 0.0% 26. 124.

TOTAL SYSTEM 3507. 3407.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.028

ANNUAL OUTPUT 200000 (TONS) 17.53 17.04
 LEVELIZED ENERGY COST (\$/TON) * 17.53 17.04
 UNIT ENERGY COST (\$/TON) **

UNDISCOUNTED PAYBACK PERIOD = 10.9 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 6.9 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW
 (COGEN, MINUS NUNCOGEN, - (THOUSANDS OF DOLLARS)) = 662.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS A CHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF Debt = 3. % EFFECTIVE TAX RATE = 50. %
 COST OF COMMON EQUITY = 7. % ECONOMIC LIFE = 30. YRS
 COST OF PREFERRED EQUITY = 0.4 % TAX LIFE = 15. YRS
 DEBT CAPITALIZATION = 30. % INVESTMENT TAX CREDIT = 10. %
 COMMON STOCK CAPITALIZ. = 70. % INSURANCE & OTHER TAXES = 3. %
 PREFERRED STOCK CAPITALIZ. = 0. % INCREMENTAL CAPITAL INV. = 0. %

AVERAGE ENERGY REQUIREMENTS

NO. 4 SIC 2221 BROAD NOVEN FABRIC HILLS

TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO. 9 ADVANCED TECHNOLOGY, DIESEL, HIGH SPEED, COAL DER. DIST.

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	2.62	12.02
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	9.09
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	55.00	0.0
COAL DERIVED RESIDUAL	5.93	0.0
COAL	0.0	0.0
OTHER	0.0	2.12
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	63.54	107.71
SOURCE	95.72	107.71
IND BYPRODUCT FUEL (10**12 BTU)		
	0.0	0.0
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	7.25	7.30
(10**12 BTU) FUEL ENERGY	55.00	77.62
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	7.30
(10**12 BTU) FUEL ENERGY	0.0	77.62
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	44.17	0.0
SOURCE	11.98	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	18.49	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	9.40	0.0
(10**9 CU FT)	10.11	0.0
OIL SAVINGS		
(10**12 BTU)	9.09	0.0
EQUIV. BBLs	1.57	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-8.62	0.0
(10**6 TONS)	-0.40	0.0

SELECTED TECHNOLOGY NON
COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE 0.410 0.0
SOURCE 0.111 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.707 0.0

F/U(0) 0.110 0.394

SPECIFIED FUEL/U(0) 0.034 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

1.0 0.0

ECS SIZE (MW)

1.90 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-ETA

0.450 0.0

SENSIBLE WASTE HEAT RATIO--A

0.967 0.0

AVBL WASTE HEAT RATIO,R'--HG
(NON ADDITIVE)

1.000 0.0

AVBL WASTE HEAT RATIO,R'-700

0.481 0.0

AVBL WASTE HEAT RATIO,R'-500

0.122 0.0

AVBL WASTE HEAT RATIO,R'-300

0.090 0.0

AVBL WASTE HEAT RATIO,R'--HH

0.0 0.0

TOTAL R

0.692 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R-700

0.0 0.0

RECOV WASTE HEAT RATIO,R-500

0.602 0.0

RECOV WASTE HEAT RATIO,R-300

0.090 0.0

RECOV WASTE HEAT RATIO,R--HH

0.0 0.0

TOTAL R

0.692 0.0

AUXILIARY POWER REQUIRED(MH)

7. 30.

AUX THERMAL EFF(10**6 BTU)

0. 0.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)				
COST CATEGORY	***** EQUIPMENT	SELECTED TECHNOLOGY INSTALLATION	*** TOTAL	NON-COGEN TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	36.	6.	41.	22.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	36.	6.	41.	22.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	2.	1.	3.	14.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	2.	1.	3.	14.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	491.	324.	815.	0.
3.2 PRIMARY GENERATOR/INVERTER	91.	0.	91.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 EDITCHING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	84.	0.	84.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	666.	324.	990.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	11.	3.	14.	74.
6. HEAT REJECTION	0.	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	14.	14.	1.
7.2 STRUCTURES	345.	0.	345.	26.
7.3 ELECTRICAL CONDITIONING & CONTROL	0.	0.	1.	3.
SUB-TOTAL	346.	14.	360.	31.
8. INDIRECT COSTS				
8.1 CONTINGENCY	212.	70.	282.	28.
8.2 ENGINEERING AND FEES	159.	52.	211.	21.
SUB-TOTAL	371.	122.	493.	49.
TOTAL CAPITAL COST ESTIMATE	1432.	469.	1901.	189.
CONSTRUCTION TIME (YEARS)	0.	1.	1.	0.
CAPITAL COST EXPENDITURE	1467.	481.	1947.	190.

ACTUAL COSTS		SELECTED TECHNOLOGY	NON COGENERATION
OPERATING COSTS 1990. (K\$/YR)			
NATURAL GAS	27.	27.	27.
PETROLEUM DISTILLATE	0.	0.	0.
PETROLEUM RESIDUAL	0.	0.	0.
COAL GAS	0.	0.	0.
COAL DERIVED DISTILLATE	800.	0.	0.
COAL DERIVED RESIDUAL	70.	316.	316.
COAL	0.	0.	0.
OTHER	0.	0.	0.
LIMESTONE/DOLOMITE	0.	0.	0.
TOTAL FUEL COST	897.	343.	
ELECTRICITY	0.	921.	
STAND-BY CHARGE	0.	0.	
O & M COST	185.	4.	
TOTAL OPERATING COSTS	1083.	1260.	
LEVELIZED OPERATING COSTS	1203.	1424.	
LEVELIZED FIXED CHARGES	197.	19.	
LEVELIZED ANNUAL COST	1399.	1443.	
COST SAVINGS	44.	0.	
COST SAVINGS RATIO	0.030	0.0	
ENVIRONMENTAL IMPACT			
PLANT EMISSIONS(TON/YR)			
SULFUR DIOXIDE	65.430	39.965	
NITROGEN OXIDES	205.541	24.250	
HYDROCARBONS	4.219	0.970	
PARTICULATES	3.080	4.850	
SUBTOTAL	278.269	70.035	
UTILITY EMISSIONS(TON/YR)			
SULFUR DIOXIDE	0.0	169.928	
NITROGEN OXIDES	0.0	99.125	
HYDROCARBONS	0.0	19.825	
PARTICULATES	0.0	14.161	
SUBTOTAL	0.0	303.037	
TOTAL	278.269	373.073	
EMISSIONS SAVINGS RATIO			
SULFUR DIOXIDE	0.668	0.0	
NITROGEN OXIDES	-0.666	0.0	
HYDROCARBONS	0.797	0.0	
PARTICULATES	0.639	0.0	
TOTAL	0.254	0.0	
SOLID WASTES	0.0	0.0	

	COST OF DEBT	=	3.8	EFFECTIVE TAX RATE	=	50.8
	COST OF COMMON EQUITY	= <th>7.4</th> <th>ECONOMIC LIFE</th> <td>=</td> <th>30 YRS</th>	7.4	ECONOMIC LIFE	=	30 YRS
	COST OF PREFERRED EQUITY	= <th>0.8</th> <th>TAX LIFE</th> <td>=</td> <th>15 YRS</th>	0.8	TAX LIFE	=	15 YRS
	COST CAPITALIZATION	= <th>30.8</th> <th>INVESTMENT TAX CREDIT</th> <td>=<th>10.8</th></td>	30.8	INVESTMENT TAX CREDIT	= <th>10.8</th>	10.8
	PREFERRED STOCK CAPITALIZ.	= <th>70.8</th> <th>INSURANCE & OTHER TAXES</th> <td>=<th>3.8</th></td>	70.8	INSURANCE & OTHER TAXES	= <th>3.8</th>	3.8
	COMMON STOCK CAPITALIZ.	= <th>0.8</th> <th>INCREMENTAL CAPITAL INV.</th> <td>=<th>0.8</th></td>	0.8	INCREMENTAL CAPITAL INV.	= <th>0.8</th>	0.8

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OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO. 6 SIC 2621 NEWSPRINT MILL TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO.11 ADVANCED TECHNOLOGY,DIESEL,LOW SPEED,COAL(PULVERIZED)

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	11.82
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	11.82
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	10.93	0.0
COAL	79.18	96.40
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	90.11	120.04
SOURCE	94.80	120.04
IND BYPRODUCT FUEL (10**12 BTU)		
	30.15	30.15
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)		
	8.58	8.58
(10**12 BTU) FUEL ENERGY		
	79.18	91.44
ELECTRICITY PURCHASED (10**9 KWH)		
	0.0	8.57
(10**12 BTU) FUEL ENERGY		
	0.0	91.44
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	29.93	0.0
SOURCE	25.25	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	23.64	0.0
NATURAL GAS SAVINGS (10**12 BTU)		
	11.82	0.0
(10**9 CU FT)		
	12.71	0.0
OIL SAVINGS (10**12 BTU)		
	11.82	0.0
EQUIV. BBLs		
	2.04	0.0
COAL SAVINGS (SOURCE)		
	1.60	0.0
(10**12 BTU)		
	0.07	0.0
(10**6 TONS)		

SELECTED TECHNOLOGY NON
COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.249 0.0
0.210 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.866 0.0

F/U(0) 0.120 0.313

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

1.0 0.0

ECS SIZE (MW)

27.81 0.0

NO. OF UNITS

5.0 0.0

ECS ELECTRICAL EFF-ETAE

0.370 0.0

SENSIBLE WASTE HEAT RATIO--A

0.855 0.0

AVBL WASTE HEAT RATIO,R'---HG
(NON ADDITIVE)

0.591 0.0

AVBL WASTE HEAT RATIO,R'-700

0.0 0.0

AVBL WASTE HEAT RATIO,R'-500

0.095 0.0

AVBL WASTE HEAT RATIO,R'-300

0.183 0.0

AVBL WASTE HEAT RATIO,R'---HW

0.409 0.0

TOTAL R

0.687 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R-700

0.0 0.0

RECOV WASTE HEAT RATIO,R-500

0.095 0.0

RECOV WASTE HEAT RATIO,R-300

0.183 0.0

RECOV WASTE HEAT RATIO,R--HW

0.081 0.0

TOTAL R

0.360 0.0

AUXILIARY POWER REQUIRED(MW)

1876. 1711.

AUX THERMAL REQ(10*6 BTU)

14. 9.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION)

F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITOL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)				
COST CATEGORY	***** SELECTED TECHNOLOGY ***		NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	3573.	1686.	5259.	725.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	3573.	1686.	5259.	725.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	242.	103.	344.	586.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	242.	103.	344.	586.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	47108.	1113.	48221.	0.
3.2 PRIMARY GENERATOR/INVERTER	11821.	0.	11821.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	8557.	0.	8557.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	67485.	1113.	68598.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	1349.	413.	1762.	2991.
6. HEAT REJECTION	1125.	623.	1747.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	864.	864.	48.
7.2 STRUCTURES	8617.	0.	8617.	442.
7.3 ELECTRICAL CONDITIONING & CONTROL	14.	20.	34.	31.
SUB-TOTAL	8630.	884.	9514.	520.
8. INDIRECT COSTS				
8.1 CONTINGENCY	16481.	964.	17445.	965.
8.2 ENGINEERING AND FEES	12361.	723.	13084.	723.
SUB-TOTAL	29841.	1687.	30529.	1688.
TOTAL CAPITAL COST ESTIMATE	111245.	6509.	117753.	6511.
CONSTRUCTION TIME(YEARS)	0.	2.	2.	0.
CAPITAL COST EXPENDITURE	116715.	6829.	123543.	6537.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS		
OPERATING COSTS 1990. (K\$/YR)		
NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	4801.	12313.
COAL	20199.	0.
OTHER	0.	0.
LIMESTONE/DOLOMITE	0.	0.
TOTAL FUEL COST	25000.	12313.
ELECTRICITY	0.	40101.
STAND-BY CHARGE	0.	0.
O & M COST	1855.	207.
TOTAL OPERATING COSTS	26855.	52621.
LEVELIZED OPERATING COSTS	29930.	59068.
LEVELIZED FIXED CHARGES	12478.	660.
LEVELIZED ANNUAL COST	42408.	59728.
COST SAVINGS	17320.	0.
COST SAVINGS RATIO	0.290	0.0
ENVIRONMENTAL IMPACT		
PLANT EMISSIONS(TON/YR)		
SULFUR DIOXIDE	7011.656	1556.671
NITROGEN OXIDES	19048.684	944.582
HYDROCARBONS	14.732	37.783
PARTICULATES	607.385	183.917
SUBTOTAL	26682.453	2727.953
UTILITY EMISSIONS(TON/YR)		
SULFUR DIOXIDE	0.0	7196.629
NITROGEN OXIDES	0.0	4314.699
HYDROCARBONS	0.0	862.940
PARTICULATES	0.0	616.386
SUBTOTAL	0.0	13190.649
TOTAL	26682.453	15918.602
EMISSIONS SAVINGS RATIO		
SULFUR DIOXIDE	0.217	0.0
NITROGEN OXIDES	-2.622	0.0
HYDROCARBONS	0.984	0.0
PARTICULATES	0.246	0.0
TOTAL	-0.676	0.0
SOLID WASTES	0.0	0.0

CASE 43 INDUSTRY'S IMPROVEMENT MILL STRATEGY-MATCH-E (UNIT: SHIP--INDUSTRIAL
 NO.11 ADVANCED TECHNOLOGY, DIESEL, LOW SPEED, COAL (PULVERIZED))

START-UP DATE = 1990.
 BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.3%
 FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%
 GENERAL INFLATION RATE = 0.0%

Power Systems Division

NOMCOGEN COGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 6537. 123543.
 LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 886274. 627643.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION 657. 12424.
 NATURAL GAS : ESCALATION RATE = 3.6% 0. 0.
 DISTILLATE : ESCALATION RATE = 1.0% 0. 0.
 RESIDUAL : ESCALATION RATE = 1.0% 13886. 5414.
 COAL : ESCALATION RATE = 1.0% 0. 22780.
 COAL GAS & OTHER : ESCALATION RATE = 1.0% 0. 0.
 ELECTRICITY : ESCALATION RATE = 1.0% 45224. 0.
 UCM, INS, ETC. : INFLATION RATE = 0.0% 207. 1855.

TOTAL SYSTEM 59974. 42473.

LEVELIZED ANNUAL COST SAVING RATIO = 0.292

ANNUAL OUTPUT 655623. (TUNS)
 LEVELIZED ENERGY COST (\$/TON) * 91.48 64.78
 UNIT ENERGY COST (\$/TON) ** 91.48 64.78

DISCOUNTED PAYBACK PERIOD = 6.0 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 15.3 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW
 (COGEN. MINUS NOMCOGEN. - (THOUSANDS OF DOLLARS)) = 126456.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT = 3. % EFFECTIVE TAX RATE = 50. %
 COST OF COMMON EQUITY = 7. % ECONOMIC LIFE = 30. YRS
 COST OF PREFERRED EQUITY = 0. % TAX LIFE = 15. YRS
 DEBT CAPITALIZATION = 30. % INVESTMENT TAX CREDIT = 10. %
 COMMON STOCK CAPITALIZ. = 70. % INSURANCE & OTHER TAXES = 2. %
 PREFERRED STOCK CAPITALIZ. = 0. % INCREMENTAL CAPITAL INV. = 0. %

FCR-1333

AVERAGE ENERGY REQUIREMENTS

NO. 6 SIC 2621 HENSPOINT MILL

TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO.25 ADVANCED TECHNOLOGY, COMBINED CYCLE, DIRECT FIRED, COAL (PFB)

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	11.82
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	11.82
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	86.43	96.40
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	86.43	120.04
SOURCE	86.43	120.04
IND BYPRODUCT FUEL (10**12 BTU)		
	30.15	30.15
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	8.61	8.57
(10**12 BTU) FUEL ENERGY	86.43	91.44
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	8.57
(10**12 BTU) FUEL ENERGY	0.0	91.44
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	33.62	0.0
SOURCE	33.62	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	23.64	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	11.82	0.0
(10**9 CU FT)	12.71	0.0
OIL SAVINGS		
(10**12 BTU)	11.82	0.0
EQUIV. EGGS	2.04	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	9.97	0.0
(10**6 TONS)	0.46	0.0

SELECTED TECHNOLOGY NON
COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.280 0.0
0.280 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.945 0.0

F/U(0) 0.000 0.313

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

1.0 0.0

ECS SIZE (MW)

69.76 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-ETA

0.305 0.0

SENSIBLE WASTE HEAT RATIO--A

0.873 0.0

AVBL WASTE HEAT RATIO,R'--HG
(HCH ADDITIVE)

0.736 0.0

AVBL WASTE HEAT RATIO,R'-700

0.200 0.0

AVBL WASTE HEAT RATIO,R'-500

0.071 0.0

AVBL WASTE HEAT RATIO,R'-300

0.118 0.0

AVBL WASTE HEAT RATIO,R'--HH

0.049 0.0

TOTAL R

0.519 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R-700

0.0 0.0

RECOV WASTE HEAT RATIO,R-500

0.351 0.0

RECOV WASTE HEAT RATIO,R-300

0.118 0.0

RECOV WASTE HEAT RATIO,R--HH

0.049 0.0

TOTAL R

0.519 0.0

AUXILIARY POWER REQUIRED(KW)

2330. 1711.

AUX THERMAL REQUIREMENT BTU)

0. 9.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)			
COST CATEGORY	**** EQUIPMENT	SELECTED TECHNOLOGY INSTALLATION	NON-COGEN TOTAL
1. FUEL/WASTE HANDLING AND STORAGE			
1.1 FUEL STORAGE AND RETRIEVAL	4133.	2189.	6322.
1.2 Limestone Storage and Retrieval	1415.	1376.	2791.
1.3 WASTE HANDLING SYSTEMS	557.	76.	633.
SUB-TOTAL	6105.	3641.	9746.
2. ECS HEAT SOURCE			
2.1 HEAT SOURCE	21520.	13273.	34794.
2.2 SPECIAL EMISSIONS CONTROLS	7.	2.	9.
2.3 FEED WATER SYSTEMS	139.	49.	188.
2.4 GASIFIER(ECS)	0.	0.	0.
SUB-TOTAL	21666.	13325.	34991.
3. ENERGY CONVERSION SYSTEM(ECS)			
3.1 PRIMARY ENERGY CONVERTER	9879.	2513.	12392.
3.2 PRIMARY GENERATOR/INVERTER	3789.	0.	3789.
3.3 SECONDARY ENERGY CONVERTER	3466.	1402.	4868.
3.4 SECONDARY GENERATOR	1237.	0.	1237.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	3439.	1137.	4576.
3.7 CONDENSERS	525.	131.	656.
3.8 HEAT PUMP	0.	0.	0.
SUB-TOTAL	22315.	5183.	27518.
4. THERMAL STORAGE	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	515.	176.	691.
6. HEAT REJECTION	1135.	581.	1716.
7. OTHER BALANCE OF PLANT ITEMS			
7.1 SITE PREPARATION	0.	782.	782.
7.2 STRUCTURES	3453.	0.	3453.
7.3 ELECTRICAL CONDITIONING & CONTROL	17.	25.	42.
SUB-TOTAL	3470.	806.	4276.
8. INDIRECT COSTS			
8.1 CONTINGENCY	11045.	4742.	15789.
8.2 ENGINEERING AND FEES	8264.	3557.	11841.
SUB-TOTAL	19329.	8299.	27628.
TOTAL CAPITAL COST ESTIMATE	74556.	32010.	106567.
CONSTRUCTION TIME(YEARS)	0.	3.	3.
CAPITAL COST EXPENDITURE	80130.	34404.	114534.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1993. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.	12313.
COAL	22940.	0.
OTHER	0.	0.
LINESTONE/DOLomite	2553.	0.
TOTAL FUEL COST	24601.	12313.

ELECTRICITY
STAND-BY CHARGE
O & M COST

0.
0.
4051.

40101.
0.
207.

TOTAL OPERATING COSTS

28652.

52621.

LEVELIZED OPERATING COSTS

31364.

59068.

LEVELIZED FIXED CHARGES

11568.

660.

LEVELIZED ANNUAL COST

42932.

59728.

COST SAVINGS

16797.

0.

COST SAVINGS RATIO

0.281

0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	6990.671	1556.671
NITROGEN OXIDES	1165.146	944.532
HYDROCARBONS	0.000	37.783
PARTICULATES	5.826	168.917
SUBTOTAL	8161.640	2727.953

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	0.0	7396.629
NITROGEN OXIDES	0.0	4314.699
HYDROCARBONS	0.0	362.940
PARTICULATES	0.0	616.366
SUBTOTAL	0.0	13190.648

TOTAL

8161.640

15918.602

EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.219	0.0
NITROGEN OXIDES	0.778	0.0
HYDROCARBONS	1.000	0.0
PARTICULATES	0.993	0.0

TOTAL

0.497

0.0

SOLID WASTES

210782.312

3.0

CASE: IN INDUSTRY-CONSUMER MILE STRATEGY-UP-INDUS. UNDER-INDUS. INDUSTRIAL
 10.25 ADVANCED ECONOMY, COMBINED CYCLE, DIRECT FUEL, COAL (FED)

START-UP DATE = 1990.
 BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-DE-100-YEARS DEBITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.36
 FIXED CHARGE MADE ON INVESTMENT CAPITAL = 10.18
 GENERAL INFLATION RATE = 0.04

	NUCIGEN	COGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	6537.	114534.
LIFE-CYCLE COST (THOUSANDS OF DOLLARS)	886274.	635231.
ANNUALIZED COSTS (THOUSANDS OF DOLLARS)		
FUEL PORTION	657.	11510.
NATURAL GAS	RESCALATION RATE = 3.08	0.
DISTILLATE	RESCALATION RATE = 1.08	0.
RESIDUAL	RESCALATION RATE = 1.08	13886.
COAL	RESCALATION RATE = 1.08	24864.
COAL GAS & OTHER	RESCALATION RATE = 1.08	0.
ELECTRICITY	RESCALATION RATE = 1.08	45224.
HEAT, ETC.	INFLATION RATE = 0.08	207.
TOTAL SYSTEM	59974.	42986.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.283

ANNUAL OUTPUT	65623. (10MS)
LEVELIZED ENERGY COST (\$/1000)	91.48 65.56
UNIT ENERGY COST (\$/1000)	91.48 65.56

UNDISCOUNTED PAYBACK PERIOD = 5.9 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 15.6 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW
 (COGEN, MINUS NUCIGEN, - THOUSANDS OF DOLLARS) = 122465.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** WAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	3.4	EFFECTIVE TAX RATE	50.8
COST OF COMMON EQUITY	7.8	ECONOMIC LIFE	30. YRS
COST OF PREFERRED EQUITY	0.4	TAX LIFE	15. YRS
COST CAPITALIZATION	30.4	INVESTMENT TAX CREDIT	10.8
CORPORATE STOCK CAPITALIZ.	70.8	INSURANCE & OTHER TAXES	3.8
PREFERRED STOCK CAPITALIZ.	0.4	INCREMENTAL CAPITAL INV.	0.8

ORIGINAL PAGE 1:
 OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

TONS) TON)

NO. 6 SIC 2621 NEWSPRINT MILL

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO.31 ADVANCED TECHNOLOGY,FUEL CELL,HIGH TEMP., COAL GASIFIER

	SELECTED TECHNOLOGY	NON COGENERATION

FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	11.82
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	11.82
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	74.65	96.40
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	74.65	120.04
SOURCE	74.65	120.04
IND BYPRODUCT FUEL (10**12 BTU)		
	30.15	30.15
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	0.48	0.57
(10**12 BTU) FUEL ENERGY	74.65	91.44
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	0.57
(10**12 BTU) FUEL ENERGY	0.0	91.44
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	45.39	0.0
SOURCE	45.39	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	23.64	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	11.82	0.0
(10**9 CU FT)	12.71	0.0
OIL SAVINGS		
(10**12 BTU)	11.82	0.0
EQUIV. EBLS	2.04	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	21.75	0.0
(10**6 TONS)	1.01	0.0

		SELECTED TECHNOLOGY	NON- COGENERATION
FUEL ENERGY UTILIZATION RATIOS			
FUEL ENERGY SAVINGS RATIO			
SITE		0.378	0.0
SOURCE		0.378	0.0
U/U(0)		0.0	1.000
ECS FUEL/U(0)		0.816	0.0
F/U(0)		0.0	0.313
SPECIFIED FUEL/U(0)		0.0	0.0
ENERGY CONVERSION SYSTEM DATA			
DESIGN OPTION		1.0	0.0
ECS SIZE (MW)		66.65	0.0
NO. OF UNITS		2.0	0.0
ECS ELECTRICAL EFF-E _{TAE}		0.276	0.0
SENSIBLE WASTE HEAT RATIO--A		0.812	0.0
AVBL WASTE HEAT RATIO,R'--HG (FROM ADDITIVE)		0.0	0.0
AVBL WASTE HEAT RATIO,R'--700		0.406	0.0
AVBL WASTE HEAT RATIO,R'--500		0.117	0.0
AVBL WASTE HEAT RATIO,R'--300		0.130	0.0
AVBL WASTE HEAT RATIO,R'--HM		0.255	0.0
TOTAL R		0.908	0.0
RECOV WASTE HEAT RATIO,R--HG		0.0	0.0
RECOV WASTE HEAT RATIO,R--700		0.0	0.0
RECOV WASTE HEAT RATIO,R--500		0.381	0.0
RECOV WASTE HEAT RATIO,R--300		0.263	0.0
RECOV WASTE HEAT RATIO,R--HM		0.055	0.0
TOTAL R		0.699	0.0
AUXILIARY POWER REQUIRED(PW)		119.	1711.
AUX. THERMAL FLOW--6 BTU		0.	9.
COP OF HEAT PUMP		0.0	0.0

F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION)

CAPITOL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)			
COST CATEGORY	***** SELECTED TECHNOLOGY ****		NON-COGEN TOTAL
	EQUIPMENT	INSTALLATION	
1. FUEL/WASTE HANDLING AND STORAGE			
1.1 FUEL STORAGE AND RETRIEVAL	3964.	2094.	6058.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.
SUB-TOTAL	3964.	2094.	6058.
2. ECS HEAT SOURCE			
2.1 HEAT SOURCE	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.
2.3 FEED WATER SYSTEMS	0.	0.	586.
2.4 GASIFIER(ECS)	57260.	16477.	73737.
SUB-TOTAL	57260.	16477.	73737.
3. ENERGY CONVERSION SYSTEM(ECS)			
3.1 PRIMARY ENERGY CONVERTER	23056.	1373.	24429.
3.2 PRIMARY GENERATOR/INVERTER	6865.	0.	6865.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	2746.	0.	2746.
3.7 CONDENSERS	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.
SUB-TOTAL	32667.	1373.	34040.
4. THERMAL STORAGE	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	0.	0.	0.
6. HEAT REJECTION	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS			
7.1 SITE PREPARATION	0.	1138.	1138.
7.2 STRUCTURES	0.	0.	0.
7.3 ELECTRICAL CONDITIONING & CONTROL	1.	1.	2.
SUB-TOTAL	1.	1140.	1141.
8. INDIRECT COSTS			
8.1 CONTINGENCY	18778.	4217.	22995.
8.2 ENGINEERING AND FEES	14054.	3163.	17246.
SUB-TOTAL	32832.	7379.	40241.
TOTAL CAPITAL COST ESTIMATE	126754.	28463.	155217.
CONSTRUCTION TIME(YEARS)	0.	3.	3.
CAPITAL COST EXPENDITURE	136217.	30586.	166805.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)	
NATURAL GAS	0.
PETROLEUM DISTILLATE	0.
PETROLEUM RESIDUAL	0.
COAL GAS	0.
COAL DERIVED DISTILLATE	0.
COAL DERIVED RESIDUAL	12313.
COAL	19044.
OTHER	0.
LIMESTONE/DOLOMITE	0.
TOTAL FUEL COST	19044. 12313.

ELECTRICITY	0.	40101.
STAND-BY CHARGE	0.	0.
O & M COST	228.	207.
TOTAL OPERATING COSTS	22472.	52621.

LEVELIZED OPERATING COSTS	24815.	59068.
LEVELIZED FIXED CHARGES	16947.	660.
LEVELIZED ANNUAL COST	41662.	59728.
COST SAVINGS	16066.	0.
COST SAVINGS RATIO	0.302	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)	
SULFUR DIOXIDE	352.249 1556.671
NITROGEN OXIDES	1011.458 944.582
HYDROCARBONS	0.0 37.783
PARTICULATES	0.0 189.917
SUBTOTAL	1363.708 2727.953

UTILITY EMISSIONS(TON/YR)	
SULFUR DIOXIDE	0.0 7396.629
NITROGEN OXIDES	0.0 4314.699
HYDROCARBONS	0.0 662.940
PARTICULATES	0.0 616.306
SUBTOTAL	0.0 13190.648

TOTAL 1363.708 15918.602

EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.961	0.0
NITROGEN OXIDES	0.808	0.0
HYDROCARBONS	1.000	0.0
PARTICULATES	1.000	0.0

TOTAL 0.914 0.0

SOLID WASTES 0.0 0.0

CASE 107 INDUSTRY - WOODPULP MILL STRATEGY-OPTIMUM UNIT: \$/HP--INDUSTRIAL
 PULP ADVANCED TECHNOLOGY-FULL CELLULOSE TEMP., COAL GASIFIER

START-UP DATE = 1990.

BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.3%

FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%

GENERAL INFLATION RATE = 0.0%

Power Systems Division

FCR-1333

NONCOGEN COGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 6537. 166805.

LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 886274. 615923.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION 657. 16774.
 NATURAL GAS ESCALATION RATE = 3.6% 0. 0.
 DISTILLATE ESCALATION RATE = 1.0% 0. 0.
 RESIDUAL ESCALATION RATE = 1.0% 13886. 0.
 COAL ESCALATION RATE = 1.0% 0. 21477.
 COAL GAS & OTHER ESCALATION RATE = 1.0% 0. 0.
 FUELS/ELECTRICITY ESCALATION RATE = 1.0% 45224. 0.
 O&M, INSUR., ETC. INFLATION RATE = 0.0% 207. 3428.

TOTAL SYSTEM 59974. 41679.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.305

ANNUAL OUTPUT 65633 (TONS)

LEVELIZED ENERGY COST (\$/TON) * 91.48 63.57

UNIT ENERGY COST (\$/TON) ** 91.48 63.57

UNDISCOUNTED PAYBACK PERIOD = 6.8 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 13.2 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(COGEN. MINUS INDICOGEN. - (THOUSANDS OF DOLLARS)) = 131605.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT = 3. % EFFECTIVE TAX RATE = 50. %
 COST OF COMMON EQUITY = 7. % ECONOMIC LIFE = 30. YRS
 COST OF PREFERRED EQUITY = 0. % TAX LIFE = 15. YRS
 DEBT CAPITALIZATION = 30. % INVESTMENT TAX CREDIT = 10. %
 COMMON STOCK CAPITALIZ. = 70. % INSURANCE & OTHER TAXES = 3. %
 PREFERRED STOCK CAPITALIZ. = 0. % INCREMENTAL CAPITAL INV. = 0. %

ORIGINAL PAGE IS
 OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO. 7 SIC 2621 WRITING PAPER MILL TONS TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO.14 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL GASIFIER

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	14.75
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	23.11
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	74.95	73.53
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	74.95	111.39
SOURCE	74.95	111.39
IND BYPRODUCT FUEL (10**12 BTU)		
	61.91	61.91
TOTAL ELECTRIC CONSUMPTION		
(10**9 KW)	5.39	5.54
(10**12 BTU) FUEL ENERGY	74.95	59.07
ELECTRICITY PURCHASED		
(10**9 KW)	0.0	5.54
(10**12 BTU) FUEL ENERGY	0.0	59.07
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	36.44	0.0
SOURCE	36.44	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	37.86	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	14.75	0.0
(10**9 CU FT)	15.86	0.0
OIL SAVINGS		
(10**12 BTU)	23.11	0.0
EQUIV. EELS	3.98	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-1.42	0.0
(10**6 TONS)	-0.07	0.0

		SELECTED TECHNOLOGY	NON COGENERATION

FUEL ENERGY UTILIZATION RATIOS			
FUEL ENERGY SAVINGS RATIO			
SITE		0.327	0.0
SOURCE		0.327	0.0
U/U(0)		0.0	1.000
ECS FUEL/U(0)		1.269	0.0
F/U(0)		0.0	0.886
SPECIFIED FUEL/U(0)		0.0	0.0
ENERGY CONVERSION SYSTEM DATA			
DESIGN OPTION		1.0	0.0
ECS SIZE (MW)		17.63	0.0
NO. OF UNITS		2.0	0.0
ECS ELECTRICAL EFF-ETA _E		0.180	0.0
SENSIBLE WASTE HEAT RATIO--A		0.840	0.0
AVBL WASTE HEAT RATIO,R'--HG (NON ADIATIVE)		1.000	0.0
AVBL WASTE HEAT RATIO,R'--700		0.610	0.0
AVBL WASTE HEAT RATIO,R'--500		0.154	0.0
AVBL WASTE HEAT RATIO,R'--300		0.114	0.0
AVBL WASTE HEAT RATIO,R'--HH		0.0	0.0
TOTAL R		0.878	0.0
RECov WASTE HEAT RATIO,R--HG		0.0	0.0
RECov WASTE HEAT RATIO,R--700		0.0	0.0
RECov WASTE HEAT RATIO,R--500		0.615	0.0
RECov WASTE HEAT RATIO,R--300		0.263	0.0
RECov WASTE HEAT RATIO,R--HH		0.0	0.0
TOTAL R		0.878	0.0
AUXILIARY POWER REQUIRED(HH)		300.	1335.
AUX THERMAL REQ(10**6 BTU)		4.	8.
COP OF HEAT PUMP		0.0	0.0

U = UTILITY FUEL		U(0) = UTILITY FUEL (NON-COGENERATION)	
		F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)	

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)			
COST CATEGORY	***** EQUIPMENT	SELECTED TECHNOLOGY *** INSTALLATION	NON-COGEN TOTAL TOTAL
1. FUEL/WASTE HANDLING AND STORAGE			
1.1 FUEL STORAGE AND RETRIEVAL	2368.	1198.	3565.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	9.	0.	0.
SUB-TOTAL	2368.	1198.	3565.
2. ECS HEAT SOURCE			
2.1 HEAT SOURCE	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.
2.3 FEED WATER SYSTEMS	85.	32.	117.
2.4 GASIFIERS(ECS)	15748.	4165.	19913.
SUB-TOTAL	15833.	4197.	20030.
3. ENERGY CONVERSION SYSTEM(ECS)			
3.1 PRIMARY ENERGY CONVERTER	2035.	977.	3013.
3.2 PRIMARY GENERATOR/INVERTER	1444.	0.	1444.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.
3.5 EDITIONING CYCLE VAPOR GENERATOR	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	1766.	562.	2328.
3.7 CONDENSERS	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.
SUB-TOTAL	5246.	1539.	6785.
4. THERMAL STORAGE	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	457.	137.	594.
6. HEAT REJECTION	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS			
7.1 SITE PREPARATION	0.	311.	311.
7.2 STRUCTURES	115.	0.	115.
7.3 ELECTRICAL CONDITIONING & CONTROL	7.	11.	17.
SUB-TOTAL	122.	322.	443.
8. INDIRECT COSTS			
8.1 CONTINGENCY	4805.	1479.	6284.
8.2 ENGINEERING AND FEES	3604.	1109.	4713.
SUB-TOTAL	8409.	2588.	10996.
TOTAL CAPITAL COST ESTIMATE	32433.	9981.	42414.
CONSTRUCTION TIME(YEARS)	0.	3.	3.
CAPITAL COST EXPENDITURE	34855.	10726.	45581.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS		-----	
OPERATING COSTS 1990. (K\$/YR)			
NATURAL GAS	0.	0.	0.
PETROLEUM DISTILLATE	0.	0.	0.
PETROLEUM RESIDUAL	0.	0.	0.
COAL GAS	0.	0.	0.
COAL DERIVED DISTILLATE	0.	0.	0.
COAL DERIVED RESIDUAL	0.	9102.	0.
COAL	7718.	0.	0.
OTHER	0.	0.	0.
LINESTONE/DOLOMITE	0.	0.	0.
TOTAL FUEL COST	7718.	9102.	
ELECTRICITY			
STAND-BY CHARGE	0.	10458.	
O & M COST	918.	161.	
TOTAL OPERATING COSTS	8636.	19720.	
LEVELIZED OPERATING COSTS			
LEVELIZED FIXED CHARGES	9586.	22126.	
LEVELIZED ANNUAL COST	4604.	538.	
COST SAVINGS	14189.	22664.	
COST SAVINGS RATIO	8474.	0.	
	0.374	0.0	
ENVIRONMENTAL IMPACT			
PLANT EMISSIONS(TON/YR)			
SULFUR DIOXIDE	1672.339	1150.662	
NITROGEN OXIDES	1019.719	693.217	
HYDROCARBONS	40.789	27.929	
PARTICULATES	0.0	139.644	
SUBTOTAL	2732.846	2016.451	
UTILITY EMISSIONS(TON/YR)			
SULFUR DIOXIDE	0.0	1925.899	
NITROGEN OXIDES	0.0	1125.192	
HYDROCARBONS	0.0	225.038	
PARTICULATES	0.0	160.742	
SUBTOTAL	0.0	3439.871	
TOTAL	2732.846	5456.320	
EMISSIONS SAVINGS RATIO			
SULFUR DIOXIDE	0.457	0.0	
NITROGEN OXIDES	0.441	0.0	
HYDROCARBONS	0.839	0.0	
PARTICULATES	1.000	0.0	
TOTAL	0.499	0.0	
SOLID WASTES	0.0	0.0	

CASE NO. INDUSTRIAL SETTING POWER WITH VARIATION-OPTIONS - 00000000-INDUSTRIAL
POWER 2002 WED 10:00:00 AM 10/10/2002 10:00:00 AM

START-UP DATE = 1990.

BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-YEARS METHOD

COST-OF-CAPITAL = 5.2%

FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%

GENERAL INFLATION RATE = 0.0%

	NONCOGEN	COGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	5325.	45575.
LIFE-CYCLE COST (THOUSANDS OF DOLLARS)	336253.	209921.
ANNUALIZED COSTS (THOUSANDS OF DOLLARS)		
FIXED PORTION		
NATURAL GAS	535.	4503.
DEPRECIATION RATE = 3.0%	0.	0.
INTEREST RATE = 1.0%	0.	0.
RESIDUAL	10265.	0.
COAL	0.	8704.
DEPRECIATION RATE = 1.0%	0.	0.
COAL GAS & OTHER	0.	0.
DEPRECIATION RATE = 1.0%	0.	0.
ELECTRICITY	11744.	0.
DEPRECIATION RATE = 1.0%	0.	0.
HEAT, INSUL., ETC.	161.	918.
INFLATION RATE = 0.0%	0.	0.
TOTAL SYSTEM	22754.	14205.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.376

ANNUAL OUTPUT 215767. (TONS)

LEVELIZED ENERGY COST (\$/TON) *

UNIT ENERGY COST (\$/TON) **

104.61 64.93
104.01 64.93

UNDISCOUNTED PAYBACK PERIOD - 5.0 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 10.0 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(COGEN. MINUS NONCOGEN. - (THOUSANDS OF DOLLARS)) = 61984.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING POWER AND GRIMS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF UNIT	3. %	EFFECTIVE TAX RATE	50. %
COST OF COMMON EQUITY	7. %	ECONOMIC LIFE	30. YRS
COST OF PREFERRED EQUITY	0. %	TAX LIFE	15. YRS
DEBT CAPITALIZATION	30. %	INVESTMENT TAX CREDIT	10. %
COMMON STOCK CAPITALIZATION	70. %	INSURANCE & OTHER TAXES	3. %
PREFERRED STOCK CAPITALIZATION	0. %	INCREMENTAL CAPITAL INW.	0. %

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OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO. 7 SIC 2621 WRITING PAPER MILL

TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO. 18 ADVANCED TECHNOLOGY, GAS TURBINE, CLOSED CYCLE, COAL (AFB)

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	14.75
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	23.11
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	69.49	73.53
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	69.49	111.39
SOURCE	69.49	111.39
IND BYPRODUCT FUEL (10**12 BTU)		
	61.91	61.91
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)		
	5.78	5.54
(10**12 BTU) FUEL ENERGY		
	69.49	59.07
ELECTRICITY PURCHASED (10**9 KWH)		
	0.0	5.54
(10**12 BTU) FUEL ENERGY		
	0.0	59.07
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	41.90	0.0
SOURCE	41.90	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	37.86	0.0
NATURAL GAS SAVINGS (10**12 BTU)		
	14.75	0.0
(10**9 CU FT)		
	15.86	0.0
OIL SAVINGS (10**12 BTU)		
	23.11	0.0
EQUIV. BBLs		
	3.98	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	4.04	0.0
(10**6 TONS)	0.19	0.0

SELECTED NON
TECHNOLOGY COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.376 0.0
0.376 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 1.176 0.0

F/U(0) 0.0 0.006

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

2.0 0.0

ECS SIZE (T/M) 10.90 0.0

NO. OF UNITS 2.0 0.0

ECS ELECTRICAL EFF-ETA 0.153 0.0

SENSE/LE WASTE HEAT RATIO--A 0.905 0.0

AVBL WASTE HEAT RATIO,R'--HG (NOT ADDITIVE) 0.0 0.0

AVBL WASTE HEAT RATIO,R'--700 0.543 0.0

AVBL WASTE HEAT RATIO,R'--500 0.137 0.0

AVBL WASTE HEAT RATIO,R'--300 0.102 0.0

AVBL WASTE HEAT RATIO,R'--HM 0.100 0.0

TOTAL R 0.990 0.0

RECOV WASTE HEAT RATIO,R--HG 0.0 0.0

RECOV WASTE HEAT RATIO,R-700 0.0 0.0

RECOV,WASTE HEAT RATIO,R-500 0.438 0.0

RECOV WASTE HEAT RATIO,R-300 0.344 0.0

RECOV WASTE HEAT RATIO,R--HM 0.042 0.0

TOTAL R 0.824 0.0

AUXILIARY POWER REQUIRED(M) 2909. 1335.

AUX THERMAL REQ(10⁶ BTU) 0. 0.

COP OF HEAT PUMP 0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)				
COST CATEGORY	***** SELECTED TECHNOLOGY ***		NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	2505.	1329.	3833.	595.
1.2 LIMESTONE STORAGE AND RETRIEVAL	1257.	1156.	2454.	0.
1.3 WASTE HANDLING SYSTEMS	428.	61.	487.	0.
SUB-TOTAL	4188.	2546.	6774.	585.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	10791.	6114.	16905.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	38.	12.	50.	472.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	10829.	6126.	16955.	472.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	1688.	1022.	2629.	0.
3.2 PRIMARY GENERATOR/INVERTER	1513.	0.	1513.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	1342.	432.	1775.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	4463.	1454.	5917.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	136.	43.	179.	2419.
6. HEAT REJECTION	199.	121.	320.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	304.	304.	39.
7.2 STRUCTURES	147.	0.	147.	353.
7.3 ELECTRICAL CONDITIONING & CONTROL	50.	78.	128.	60.
SUB-TOTAL	196.	382.	578.	452.
8. INDIRECT COSTS				
8.1 CONTINGENCY	4002.	2142.	6145.	786.
8.2 ENGINEERING AND FEES	3002.	1607.	4609.	559.
SUB-TOTAL	7004.	3749.	10753.	1375.
TOTAL CAPITAL COST ESTIMATE (CONSTRUCTION TIME/YEARS)	27016.	14461.	41477.	5304.
CAPITAL COST EXPENDITURE	0.	3.	3.	0.
	28697.	15360.	44057.	5325.

SELECTED NDI
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.	9102.
COAL	7156.	0.
OTHER	0.	0.
LIMESTONE/DOLOMITE	1531.	0.
TOTAL FUEL COST	8687.	9102.

ELECTRICITY
STAND-BY CHARGE
O & M COST

ELECTRICITY	0.	10459.
STAND-BY CHARGE	0.	0.
O & M COST	659.	161.

TOTAL OPERATING COSTS

TOTAL OPERATING COSTS	9346.	19720.
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LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

LEVELIZED OPERATING COSTS	10226.	22126.
LEVELIZED FIXED CHARGES	4450.	538.
LEVELIZED ANNUAL COST	14676.	22664.
COST SAVINGS	7988.	0.
COST SAVINGS RATIO	0.352	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	2269.028	1150.662
NITROGEN OXIDES	378.171	693.217
HYDROCARBONS	0.0	27.929
PARTICULATES	189.086	139.644
SUBTOTAL	2836.285	2016.451

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	0.0	1928.899
NITROGEN OXIDES	0.0	1125.192
HYDROCARBONS	0.0	225.030
PARTICULATES	0.0	160.742
SUBTOTAL	0.0	3439.871

TOTAL

TOTAL	2836.285	5456.320
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EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.263	0.0
NITROGEN OXIDES	0.793	0.0
HYDROCARBONS	1.000	0.0
PARTICULATES	0.371	0.0

TOTAL

TOTAL	0.460	0.0
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SOLID WASTES

SOLID WASTES	35997.937	0.0
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CASE 71 INDUSTRY-SETTING POWER MILL STRATEGY-OUTFIRM OWNER: HIP--INDUSTRIAL
 FUEL: FURNACE TECHNOLOGY GAS TURNING CYCLE, COAL (AFB)

START-UP DATE = 1990.

BASE YEAR OF COST ESTIMATES = 1976.

DEPRECIATION-SUM-OF-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.3%

FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%

GENERAL INFLATION RATE = 0.0%

	NONCNGEN	CNGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	5325.	44099.
LEAK-CYCLE COST (THOUSANDS OF DOLLARS)	336225.	217155.
ANNUALIZED COSTS (THOUSANDS OF DOLLARS)		
FIXED PORTION		
NATURAL GAS	535.	4435.
DISTILLATE	0.	0.
RESIDUAL	10265.	0.
COAL	0.	8070.
COAL GAS & OTHER	0.	0.
ELECTRICITY	11794.	0.
OLM, INS, ETC.	161.	2190.
TOTAL SYSTEM	22754.	14695.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.354

ANNUAL OUTPUT 218757. TONS

LEVELIZED ENERGY COST (B/TON) *

NET ENERGY COST (B/TON) **

104.01 67.17
 104.01 67.17

UNDISCOUNTED PAYBACK PERIOD

= 5.1 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN

= 18.4 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(CNGEN, NONCNGEN) = (THOUSANDS OF DOLLARS) = 58328.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 3.4	EFFECTIVE TAX RATE	= 50. %
COST OF COMMON EQUITY	= 7.4	ECONOMIC LIFE	= 30. YRS
COST OF DEFERRED FUELITY	= 0.4	TAX LIFE	= 15. YRS
DEBT CAPITALIZATION	= 50. %	INVESTMENT TAX CREDIT	= 10. %
COMMON STOCK CAPITALIZ.	= 50. %	INSURANCE & OTHER TAXES	= 3. %
DEFERRED STOCK CAPITALIZ.	= 0. %	INCREMENTAL CAPITAL INW.	= 0. %

AVERAGE ENERGY REQUIREMENTS

NO. 8 SIC 2631 CORRUGATED PAPER MILL TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO. 2 CURRENT TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	143.37
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	96.92
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	437.29	265.49
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	437.29	505.78
SOURCE	437.29	505.78
IND BYPRODUCT FUEL (10**12 BTU)		
	300.15	300.15
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)		
	20.28	19.26
(10**12 BTU) FUEL ENERGY		
	437.29	205.42
ELECTRICITY PURCHASED (10**9 KWH)		
	0.0	19.26
(10**12 BTU) FUEL ENERGY		
	0.0	205.42
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	68.49	0.0
SOURCE	68.49	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	240.29	0.0
NATURAL GAS SAVINGS (10**12 BTU)		
	143.37	0.0
(10**9 CU FT)		
	154.13	0.0
OIL SAVINGS (10**12 BTU)		
	96.92	0.0
EQUIV. EBLs		
	16.71	0.0
COAL SAVINGS (SOURCE) (10**12 BTU)		
	-171.80	0.0
(10**6 TONS)		
	-7.97	0.0

SELECTED TECHNOLOGY NON COGENERATION

FUEL ENERGY UTILIZATION RATIOS

FUEL ENERGY SAVINGS RATIO
SITE SOURCE

U/U(0) 0.135 0.0 0.135 0.0 1.000

ECS FUEL/U(0) 2.129 0.0

F/U(0) 0.0 1.462

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

10.0 0.0

ECS SIZE (MW)

48.25 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-EAE

0.155 0.0

SENSIBLE WASTE HEAT RATIO--A

0.904 0.0

AVBL WASTE HEAT RATIO,R'--HG
(HIGH ADDITIVE)

0.0 0.0

AVBL WASTE HEAT RATIO,R'--700

0.0 0.0

AVBL WASTE HEAT RATIO,R'--500

0.0 0.0

AVBL WASTE HEAT RATIO,R'--300

0.665 0.0

AVBL WASTE HEAT RATIO,R'--HW

0.0 0.0

TOTAL R

0.865 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R--700

0.0 0.0

RECOV WASTE HEAT RATIO,R--500

0.0 0.0

RECOV WASTE HEAT RATIO,R--300

0.743 0.0

RECOV WASTE HEAT RATIO,R--HW

0.107 0.0

TOTAL R

0.850 0.0

AUXILIARY POWER REQUIRED(KW)

9927. 5096.

AUX THERMAL REQ(10*6 BTU)

146. 23.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION)

F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)			
COST CATEGORY	***** SELECTED TECHNOLOGY *** EQUIPMENT INSTALLATION	NON-COGEN TOTAL	NON-COGEN TOTAL
1. FUEL/WASTE HANDLING AND STORAGE			
1.1 FUEL STORAGE AND RETRIEVAL	6070.	3303.	9373.
1.2 LIMESTONE STORAGE AND RETRIEVAL	930.	860.	1790.
1.3 WASTE HANDLING SYSTEMS	638.	138.	776.
SUB-TOTAL	7638.	4300.	11939.
2. ECS HEAT SOURCE			
2.1 HEAT SOURCE	15900.	12631.	28531.
2.2 SPECIAL EMISSIONS CONTROLS	23333.	758.	24091.
2.3 FEED WATER SYSTEMS	899.	502.	1400.
2.4 GASIFIER(ECS)	0.	0.	0.
SUB-TOTAL	40131.	13891.	54023.
3. ENERGY CONVERSION SYSTEM(ECS)			
3.1 PRIMARY ENERGY CONVERTER	7419.	587.	8006.
3.2 PRIMARY GENERATOR/INVERTER	3097.	0.	3097.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.
3.5 BOTTLING CYCLE VAPOR GENERATOR	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	0.	0.	0.
3.7 CONDENSERS	151.	38.	189.
3.8 HEAT PUMP	0.	0.	0.
SUB-TOTAL	10667.	625.	11291.
4. THERMAL STORAGE	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	2008.	695.	2703.
6. HEAT REJECTION	268.	156.	424.
7. OTHER BALANCE OF PLANT ITEMS			
7.1 SITE PREPARATION	0.	813.	813.
7.2 STRUCTURES	754.	0.	754.
7.3 ELECTRICAL CONDITIONING & CONTROL	83.	124.	207.
SUB-TOTAL	837.	939.	1775.
8. INDIRECT COSTS			
8.1 CONTINGENCY	12310.	4121.	16431.
8.2 ENGINEERING AND FEES	9232.	3091.	12323.
SUB-TOTAL	21542.	7212.	28754.
TOTAL CAPITAL COST ESTIMATE	83090.	27818.	110908.
CONSTRUCTION TIME(YEARS)	0.	3.	3.
CAPITAL COST EXPENDITURE	89505.	29966.	119470.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.	37878.
COAL	32777.	0.
OTHER	0.	0.
LIMESTONE/DOLOMITE	864.	0.
TOTAL FUEL COST	33640.	37878.

ELECTRICITY
STAND-BY CHARGE
O & M COST

0.
0.
2506.

26468.
0.
618.

TOTAL OPERATING COSTS

36146.

64963.

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

40178.
12067.
52344.
22554.
0.302

72877.
1921.
74798.
0.
0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS (TON/YR)

SULFUR DIOXIDE	10392.687	4789.539
NITROGEN OXIDES	6062.402	2905.667
HYDROCARBONS	1212.490	116.227
PARTICULATES	866.057	591.133
SUBTOTAL	18533.625	8391.562

UTILITY EMISSIONS (TON/YR)

SULFUR DIOXIDE	0.0	4301.945
NITROGEN OXIDES	0.0	2647.802
HYDROCARBONS	0.0	569.561
PARTICULATES	0.0	406.829
SUBTOTAL	0.0	8706.133

TOTAL

18533.625

17097.695

EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	-0.075	0.0
NITROGEN OXIDES	-0.054	0.0
HYDROCARBONS	-0.768	0.0
PARTICULATES	0.123	0.0

TOTAL

-0.004

0.0

SOLID WASTES

202093.187

0.0

UNIT 9 PAPER INC. BROOKFIELD PAPER STRATEGY-MATCHED OWNED SHIP--INDUSTRIAL
 10% 2 CUMULATIVE FUTURE INFLATION (15% PS(10%)), COAL

START-UP DATE = 1976.
 BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION--SUM-OF-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.3%

FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%

GENERAL INFLATION RATE 0.0%

NONCUMULATIVE COGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 19018. 119470.
 LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 1109726. 773569.

ACTUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION	1912.	12014.
NATURAL GAS	RESCALATION RATE = 3.6%	0.
DISTILLATE	RESCALATION RATE = 1.0%	0.
RESIDUAL	RESCALATION RATE = 1.0%	42716.
COAL	RESCALATION RATE = 1.0%	0.
COAL GAS & OTHER	RESCALATION RATE = 1.0%	36964.
ELECTRICITY	RESCALATION RATE = 1.0%	0.
CFR, INS., ETC.	INFLATION RATE = 0.0%	3370.
TOTAL SYSTEM	75095.	52347.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.303

ANNUAL OUTPUT 619935 (TONS)

LEVELIZED ENERGY COST (¢/TON) *

UNIT ENERGY COST (¢/TON) **

91.59 63.84
 91.59 63.84

UNDISCOUNTED PAYBACK PERIOD = 4.8 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 19.5 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(CUMULATIVE NET PRESENT VALUE - (THOUSANDS OF DOLLARS)) = 164963.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 3.4	EFFECTIVE TAX RATE	= 50.4
COST OF COMMON EQUITY	= 7.4	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0.4	TAX LIFE	= 15. YRS
UNIT CAPITALIZATION	= 20.4	INVESTMENT TAX CREDIT	= 10.4
CUMULATIVE STOCK CAPITALIZ.	= 10.4	INSURANCE & OTHER TAXES	= 3.4
PREFERRED STOCK CAPITALIZ.	= 0.4	INCREMENTAL CAPITAL INV.	= 0.4

ORIGINAL PAGE IS
 OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO. 8 SIC 2631 CORRUGATED PAPER MILL TONS) TON)

TIME FRAME = 1990.

STRATEGY : OPTIMUM

SELECTED TECHNOLOGY = NO. 8 ADVANCED TECHNOLOGY, STEAM TURBINE, 615 PSIA(EXT), COAL(AFB)

	SELECTED TECHNOLOGY	NON COGENERATION

FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	143.37
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	96.92
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	394.62	265.49
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	394.62	505.78
SOURCE	394.62	505.78
IND BYPRODUCT FUEL (10**12 BTU)	300.15	300.15
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)	21.23	19.26
(10**12 BTU) FUEL ENERGY	394.62	205.42
ELECTRICITY PURCHASED (10**9 KWH)	8.26	19.26
(10**12 BTU) FUEL ENERGY	88.14	205.42
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	111.16	0.0
SOURCE	111.16	0.0
TOT OIL AND GAS SAVE(10**12 BTU)	240.29	0.0
NATURAL GAS SAVINGS (10**12 BTU)	143.37	0.0
(10**9 CU FT)	154.13	0.0
OIL SAVINGS (10**12 BTU)	96.92	0.0
EQUIV. BBL	16.71	0.0
COAL SAVINGS (SOURCE) (10**12 BTU)	-129.13	0.0
(10**6 TONS)	-5.99	0.0

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.220 0.0
0.220 0.0

U/UCO 0.429 1.000

ECS FUEL/UCO 1.492 0.0

F/UCO 0.0 1.462

SPECIFIED FUEL/UCO 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

4.0 0.0

ECS SIZE (MW)

29.31 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-EAE

0.078 0.0

SENSIBLE WASTE HEAT RATIO--A

0.917 0.0

AVBL WASTE HEAT RATIO,R'--HG
(FROM ADJUTIVE)

0.0 0.0

AVBL WASTE HEAT RATIO,R'--700

0.601 0.0

AVBL WASTE HEAT RATIO,R'--500

0.152 0.0

AVBL WASTE HEAT RATIO,R'--300

0.113 0.0

AVBL WASTE HEAT RATIO,R'--HM

0.0 0.0

TOTAL R

0.866 0.0

REC'D WASTE HEAT RATIO,R'--HG

0.0 0.0

REC'D WASTE HEAT RATIO,R'--700

0.0 0.0

REC'D WASTE HEAT RATIO,R'--500

0.375 0.0

REC'D WASTE HEAT RATIO,R'--300

0.467 0.0

REC'D WASTE HEAT RATIO,R'--HM

0.023 0.0

TOTAL R

0.866 0.0

AUXILIARY POWER REQUIREMENT

14458. 5098.

ADA INITIAL RATIO--% BUD

0. 22.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL UCO = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITOL COST ACCOUNTING FOR TYPICAL PLANT
(\$ 000)

COST CATEGORY	SELECTED TECHNOLOGY ***		NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	5945.	3230.	9174.	1042.
1.2 LIMESTONE STORAGE AND RETRIEVAL	2395.	2376.	4771.	0.
1.3 WASTE HANDLING SYSTEMS	1073.	146.	1219.	0.
SUB-TOTAL	9413.	5752.	15165.	1042.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	22750.	11379.	34137.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	619.	452.	1271.	1753.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	23577.	11831.	35408.	1753.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	5165.	349.	5514.	0.
3.2 PRIMARY GENERATOR/INVERTER	2222.	0.	2222.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	9.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	0.	0.	0.	0.
3.7 CONDENSERS	223.	56.	279.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	7610.	405.	8015.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	250.	89.	340.	8948.
6. HEAT REJECTION	414.	231.	644.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	607.	607.	139.
7.2 STRUCTURES	643.	0.	643.	1236.
7.3 ELECTRICAL CONDITIONING & CONTROL	181.	180.	460.	113.
SUB-TOTAL	824.	887.	1711.	1488.
8. INDIRECT COSTS				
8.1 CONTINGENCY	8419.	3939.	12250.	2806.
8.2 ENGINEERING AND FEES	6314.	2879.	9193.	2105.
SUB-TOTAL	14733.	6710.	21451.	4911.
TOTAL CAPITAL COST ESTIMATE	56820.	25913.	82741.	18942.
CONSTRUCTION TIME(YEARS)	0.	3.	3.	0.
CAPITAL COST EXPENDITURE	60860.	27752.	88612.	19010.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.	37878.
COAL	22972.	0.
OTHER	0.	0.
LIMESTONE/DOLOMITE	3970.	0.
TOTAL FULL COST	26943.	37878.

ELECTRICITY
STAND-BY CHARGE
O & M COST

ELECTRICITY	11356.	26468.
STAND-BY CHARGE	0.	0.
O & M COST	1695.	618.
TOTAL OPERATING COSTS	39994.	64963.

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

LEVELIZED OPERATING COSTS	44216.	72877.
LEVELIZED FIXED CHARGES	8950.	1921.
LEVELIZED ANNUAL COST	53166.	74798.
COST SAVINGS	21632.	0.
COST SAVINGS RATIO	0.299	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	7283.980	4788.539
NITROGEN OXIDES	1213.997	2905.667
HYDROCARBONS	0.0	116.227
PARTICULATES	606.998	581.133
SUBTOTAL	9104.973	8391.562

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	2094.643	4881.945
NITROGEN OXIDES	1221.875	2847.802
HYDROCARBONS	244.375	569.561
PARTICULATES	174.554	406.829
SUBTOTAL	3735.447	8706.133

TOTAL

TOTAL	12840.410	17097.695
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EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.030	0.0
NITROGEN OXIDES	0.577	0.0
HYDROCARBONS	0.644	0.0
PARTICULATES	0.209	0.0
TOTAL	0.249	0.0

SOLID WASTES

SOLID WASTES	405840.375	0.0
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1. PROJECT INFORMATION: PROJECT NAME - SINGAPORE-UPPER MERIDIAN (SINGAPORE-UPPER MERIDIAN)
 PROJECT LOCATION - SINGAPORE (SINGAPORE)
 PROJECT TYPE - INDUSTRIAL

2. DESIGN DATA: 1.0 MW
 BASE YEAR OF COST ESTIMATES - 1976

3. DEPRECIATION: 50% - 10 YEARS (UNITED STATES METHOD)

4. AFTER-TAX COST-OF-CAPITAL - 5.2%
 5. PRESENT COST RATE ON INVESTMENT CAPITAL - 10.1%
 6. GENERAL INFLATION RATE - 6.0%

	MININGEN	COGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	14010.	88612.
10-YEAR CYCLE COST (THOUSANDS OF DOLLARS)	1109726.	787505.
AGGREGATED COSTS (THOUSANDS OF DOLLARS)		
NATURAL GAS	1412.	8911.
WATER	0.	0.
COAL	42712.	0.
COAL GAS & OTHER	0.	25907.
COGEN	29845.	12807.
COGEN, ETC.	619.	5666.
TOTAL SYSTEM	75095.	53290.

1. INVESTED FUND COST SAVINGS RATIO - 0.290

ANNUAL OUTPUT	61973. (100%)
UNITED STATES COST (100%)	91.59
UNIT ENERGY COST (100%)	91.59
	64.99

2. PROJECTED PAYBACK PERIOD - 4.0 YEARS

3. PROJECTED CASH FLOW RATE OF RETURN - 23.8 %

4. PRESENT VALUE OF INCREMENTAL CASH FLOW (COGEN, MININGEN - (THOUSANDS OF DOLLARS)) - 158279.

5. BASED ON ANNUAL OUTPUT OF PRODUCT

6. BASED ON OPERATING VALUE IN YEARS OF CONSTANT PURCHASING POWER AND CUMULATIVE GROSSLY AT THE GENERAL INFLATION RATE

COST OF UNIT	2.5	EFFECTIVE TAX RATE	50.1
COST OF CAPITAL	7.1	ECONOMIC LIFE	30.1 YRS
COST OF DEPRECIATION	0.4	TAX LIFE	15.1 YRS
COST OF CAPITALIZATION	20.1	INVESTMENT TAX CREDIT	10.1
COST OF CAPITALIZATION	20.1	INSURANCE & OTHER TAXES	2.1
COST OF CAPITALIZATION	0.1	INCREASING CAPITAL INV.	0.1

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AVERAGE ENERGY REQUIREMENTS

NO. 8 SIC 2631 CORRUGATED PAPER MILL TONS) TON)

TIME FRAME = 1990.

STRATEGY : OPTIMUM

SELECTED TECHNOLOGY = NO.12 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,PETR. BOILER AND

	SELECTED TECHNOLOGY	NON COGENERATION

FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	143.37
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	541.91	96.92
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	-358.97	265.49
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	182.94	505.78
SOURCE	182.94	505.78
IND BYPRODUCT FUEL (10**12 BTU)	300.15	300.15
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)	18.71	19.26
(10**12 BTU) FUEL ENERGY	182.65	205.42
ELECTRICITY PURCHASED (10**9 KWH)	-33.66	19.26
(10**12 BTU) FUEL ENERGY	-358.97	205.42
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	322.84	0.0
SOURCE	322.84	0.0
TOT OIL AND GAS SAVE(10**12 BTU)	-301.62	0.0
NATURAL GAS SAVINGS (10**12 BTU)	143.37	0.0
(10**9 CU FT)	154.13	0.0
OIL SAVINGS (10**12 BTU)	-445.00	0.0
EQUIV. BBL'S	-76.72	0.0
COAL SAVINGS (SOURCE) (10**12 BTU)	624.46	0.0
(10**6 TONS)	29.97	0.0

SELECTED TECHNOLOGY NON COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.373 0.0
0.373 0.0

U/U(0) -1.748 1.000

ECS FUEL/U(0) 2.637 0.0

F/U(0) 0.001 1.462

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

3.0 0.0

ECS SIZE (MW) 78.94 0.0

NO. OF UNITS 3.0 0.0

ECS ELECTRICAL EFF-ETAE 0.330 0.0

SENSIBLE WASTE HEAT RATIO--A 0.911 0.0

AVBL WASTE HEAT RATIO,R'--HG (NON ADDITIVE) 1.000 0.0

AVBL WASTE HEAT RATIO,R'--700 0.546 0.0

AVBL WASTE HEAT RATIO,R'--500 0.138 0.0

AVBL WASTE HEAT RATIO,R'--300 0.102 0.0

AVBL WASTE HEAT RATIO,R'--HW 0.008 0.0

TOTAL R 0.794 0.0

RECOV WASTE HEAT RATIO,R'--HG 0.0 0.0

RECOV WASTE HEAT RATIO,R'--700 0.0 0.0

RECOV WASTE HEAT RATIO,R'--500 0.546 0.0

RECOV WASTE HEAT RATIO,R'--300 0.241 0.0

RECOV WASTE HEAT RATIO,R'--HW 0.008 0.0

TOTAL R 0.794 0.0

AUXILIARY POWER REQUIRED(KW) 2492. 5098.

AUX THERMAL REQ(10**6 BTU) 44. 22.

COP OF HEAT PUMP 0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITOL COST ACCOUNTING FOR TYPICAL PLANT
(\$ 000)

COST CATEGORY	***** SELECTED TECHNOLOGY ****		NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	2201.	345.	2546.	1842.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	2201.	345.	2546.	1842.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	456.	191.	647.	1753.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	456.	191.	647.	1753.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	12600.	5021.	17621.	0.
3.2 PRIMARY GENERATOR/INVERTER	7532.	0.	7532.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	5635.	1753.	7388.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	25766.	6774.	32541.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	2540.	775.	3315.	8948.
6. HEAT REJECTION	0.	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	404.	404.	139.
7.2 STRUCTURES	1280.	0.	1280.	1236.
7.3 ELECTRICAL CONDITIONING & CONTROL	15.	21.	36.	113.
SUB-TOTAL	1295.	425.	1720.	1488.
8. INDIRECT COSTS				
8.1 CONTINGENCY	6452.	1702.	8154.	2806.
8.2 ENGINEERING AND FEES	4839.	1277.	6115.	2105.
SUB-TOTAL	11290.	2979.	14269.	4911.
TOTAL CAPITAL COST ESTIMATE	43548.	11489.	55037.	18942.
CONSTRUCTION TIME(YEARS)	0.	1.	1.	0.
CAPITAL COST EXPENDITURE	44606.	11768.	56374.	19018.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	69954.	37878.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.	0.
COAL	0.	0.
OTHER	0.	0.
LIMESTONE/DOLOMITE	0.	0.
TOTAL FUEL COST	69954.	37878.

ELECTRICITY
STAND-BY CHARGE
O & M COST

-27752.	26468.
0.	0.
6030.	618.

TOTAL OPERATING COSTS

48232.	64963.
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LEVELIZED OPERATING COSTS

53423.	72877.
5694.	1921.
59117.	74798.
COST SAVINGS	15681.
COST SAVINGS RATIO	0.210

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	8156.828	4416.613
NITROGEN OXIDES	5366.332	2905.667
HYDROCARBONS	214.654	116.227
PARTICULATES	321.900	92.981
SUBTOTAL	14059.711	7531.484

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	-8531.461	4881.945
NITROGEN OXIDES	-4976.687	2847.802
HYDROCARBONS	-995.337	569.561
PARTICULATES	-710.955	406.829
SUBTOTAL	-15214.437	8706.133

TOTAL

-1154.727	16237.617
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EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.543	0.0
NITROGEN OXIDES	0.500	0.0
HYDROCARBONS	0.872	0.0
PARTICULATES	0.734	0.0

TOTAL

0.553	0.0
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SOLID WASTES

0.0	0.0
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CASE 40 FUNDING: IRRADIATION PAPER STRATEGY-OPTIMUM DUNE: SHIP-UTILITY
NO. 12 ADVANCED TECHNOLOGY GAS TUBING, DIRECT FIRED, PEIR. BOILER GRD

START-UP DATE = 1990.
BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-TWO-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 3.5%
FIXED CHARGE RATE ON INVESTMENT CAPITAL = 7.9%
GENERAL INFLATION RATE = 0.0%

	NONCOGEN	COGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	19018.	56374.
LIFE-CYCLE COST (THOUSANDS OF DOLLARS)	1390263.	1079139.
ANNUALIZED COSTS (THOUSANDS OF DOLLARS)		
FIXED PORTION	1504.	4459.
NATURAL GAS		0.
DISILL-TE		0.
RESIDUAL	43248.	79873.
COAL	0.	0.
COAL GAS & OTHER	0.	0.
ELECTRICITY	30221.	-31687.
DEMANDS, ETC.	618.	6030.
TOTAL SYSTEM	75591.	58674.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.224

ANNUAL OUTPUT 819933 (TONS)

LEVELIZED ENERGY COST (\$/TON) *

UNIT ENERGY COST (\$/TON) **

92.19 71.56
92.19 71.56

UNDISCOUNTED PAYBACK PERIOD = 3.6 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 27.5 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(COGEN, MINUS NONCOGEN, - (THOUSANDS OF DOLLARS)) = 153127.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 2. %	EFFECTIVE TAX RATE	= 50. %
COST OF COMMON EQUITY	= 6. %	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0. %	TAX LIFE	= 30. YRS
DEBT CAPITALIZATION	= 50. %	INVESTMENT TAX CREDIT	= 10. %
COMMON STOCK CAPITALIZATION	= 50. %	INSURANCE & OTHER TAXES	= 2. %
PREFERRED STOCK CAPITALIZATION	= 0. %	INCREMENTAL CAPITAL INV.	= 0. %

AVERAGE ENERGY REQUIREMENTS

TONS) TON)

NO. 8 SIC 2631 CORRUGATED PAPER MILL

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO.16 ADVANCED TECHNOLOGY,GAS TURBINE,INDIRECT FIRED,COAL(AFB)

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	143.37
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	96.92
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	328.43	265.49
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	328.43	505.78
SOURCE	328.43	505.78
IND BYPRODUCT FUEL (10**12 BTU)		
	300.15	300.15
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	20.21	19.26
(10**12 BTU) FUEL ENERGY	328.43	205.42
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	19.26
(10**12 BTU) FUEL ENERGY	0.0	205.42
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	177.34	0.0
SOURCE	177.34	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	240.29	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	143.37	0.0
(10**9 CU FT)	154.13	0.0
OIL SAVINGS		
(10**12 BTU)	96.92	0.0
EQUIV. BBLs	16.71	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-62.95	0.0
(10**6 TONS)	-2.92	0.0

		SELECTED TECHNOLOGY	NON- COGENERATION
FUEL ENERGY UTILIZATION RATIOS			
FUEL ENERGY SAVINGS RATIO		0.351	0.0
SITE SOURCE		0.351	0.0
U/U(0)		0.0	1.000
ECS FUEL/U(0)		1.599	0.0
F/U(0)		0.0	1.462
SPECIFIED FUEL/U(0)		0.0	0.0
ENERGY CONVERSION SYSTEM DATA			
DESIGN OPTION		3.0	0.0
ECS SIZE (MW)		48.09	0.0
NO. OF UNITS		2.0	0.0
ECS ELECTRICAL EFF-E7AE		0.113	0.0
SENSIBLE WASTE HEAT RATIO--A		0.911	0.0
AVBL WASTE HEAT RATIO,R'--HG (NON ADDITIVE)		1.000	0.0
AVBL WASTE HEAT RATIO,R'--700		0.603	0.0
AVBL WASTE HEAT RATIO,R'--500		0.153	0.0
AVBL WASTE HEAT RATIO,R'--300		0.113	0.0
AVBL WASTE HEAT RATIO,R'--HW		0.0	0.0
TOTAL R		0.868	0.0
RECOV WASTE HEAT RATIO,R--HG		0.0	0.0
RECOV WASTE HEAT RATIO,R--700		0.0	0.0
RECOV WASTE HEAT RATIO,R--500		0.366	0.0
RECOV WASTE HEAT RATIO,R--300		0.456	0.0
RECOV WASTE HEAT RATIO,R--HW		0.047	0.0
TOTAL R		0.868	0.0
AUXILIARY POWER REQUIRED(KW)			
AUX THERMAL REQ(10**6 BTU)		9591.	5098.
COP OF HEAT PUMP		0.	22.
		0.0	0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)			
COST CATEGORY	***** SELECTED TECHNOLOGY *** EQUIPMENT INSTALLATION	TOTAL	NON-COGEN TOTAL
1. FUEL/WASTE HANDLING AND STORAGE			
1.1 FUEL STORAGE AND RETRIEVAL	6072.	3304.	9376.
1.2 Limestone Storage and Retrieval	3102.	3078.	6180.
1.3 WASTE HANDLING SYSTEMS	1208.	165.	1373.
SUB-TOTAL	10382.	6546.	16929.
2. ECS HEAT SOURCE			
2.1 HEAT SOURCE	32947.	18889.	51836.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.
2.3 FEED WATER SYSTEMS	158.	59.	217.
2.4 GASIFIER(ECS)	0.	0.	0.
SUB-TOTAL	33104.	18948.	52053.
3. ENERGY CONVERSION SYSTEM(ECS)			
3.1 PRIMARY ENERGY CONVERTER	8578.	2209.	10786.
3.2 PRIMARY GENERATOR/INVERTER	3313.	0.	3313.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	9175.	2855.	12030.
3.7 CONDENSERS	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.
SUB-TOTAL	21066.	5063.	26129.
4. THERMAL STORAGE	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	602.	208.	810.
6. HEAT REJECTION	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS			
7.1 SITE PREPARATION	0.	968.	968.
7.2 STRUCTURES	692.	0.	692.
7.3 ELECTRICAL CONDITIONING & CONTROL	60.	121.	201.
SUB-TOTAL	772.	1089.	1861.
8. INDIRECT COSTS			
8.1 CONTINGENCY	13185.	6371.	19556.
8.2 ENGINEERING AND FEES	9889.	4778.	14667.
SUB-TOTAL	23074.	11149.	34224.
TOTAL CAPITAL COST ESTIMATE	89001.	43005.	132006.
CONSTRUCTION TIME(YEARS)	0.	3.	3.
CAPITAL COST EXPENDITURE	96169.	46468.	142636.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.	37878.
COAL	24618.	0.
OTHER	0.	0.
LIMESTONE/DOLomite	5143.	0.
TOTAL FUEL COST	29761.	37878.

ELECTRICITY
STAND-BY CHARGE
O & M COST

ELECTRICITY	0.	26468.
STAND-BY CHARGE	0.	0.
O & M COST	2218.	618.
TOTAL OPERATING COSTS	31979.	64963.

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

LEVELIZED OPERATING COSTS	35007.	72877.
LEVELIZED FIXED CHARGES	14306.	1921.
LEVELIZED ANNUAL COST	49413.	74799.
COST SAVINGS	25385.	0.
COST SAVINGS RATIO	0.339	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	7805.633	4788.539
NITROGEN OXIDES	1300.939	2905.667
HYDROCARBONS	0.0	116.227
PARTICULATES	650.469	581.133
SUBTOTAL	9757.039	8391.562

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	0.0	4891.945
NITROGEN OXIDES	0.0	2847.802
HYDROCARBONS	0.0	569.561
PARTICULATES	0.0	406.839
SUBTOTAL	0.0	8706.133

TOTAL

TOTAL	9757.039	17697.695
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EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.193	0.0
NITROGEN OXIDES	0.774	0.0
HYDROCARBONS	1.000	0.0
PARTICULATES	0.342	0.0
TOTAL	0.429	0.0

SOLID WASTES

SOLID WASTES	456969.562	0.0
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AVERAGE ENERGY REQUIREMENTS

NO. 8 SIC 2631 CORRUGATED PAPER MILL TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO. 33 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL (AFB)

	SELECTED TECHNOLOGY	NEW/ COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	143.37
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	96.92
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	421.99	265.49
OTHER	0.0	0.0
TOT FUEL CONSUMPTION (10**12 BTU)		
SITE	421.99	505.78
SOURCE	421.99	505.78
IPED BYPRODUCT FUEL (10**12 BTU)		
	300.15	300.15
TOTAL ELECTRIC CONSUMPTION (10**9 KW)		
	19.70	19.26
(10**12 BTU) FUEL ENERGY		
	173.37	205.42
ELECTRICITY PURCHASED (10**9 KW)		
	0.0	19.26
(10**12 BTU) FUEL ENERGY		
	0.0	205.42
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	63.78	6.0
SOURCE	63.73	0.0
TOT OIL AND GAS SAVE (10**12 BTU)		
	240.29	0.0
NATURAL GAS SAVINGS (10**12 BTU)		
	143.37	0.0
(10**9 CU FT)		
	154.13	0.0
OIL SAVINGS (10**12 BTU)		
	96.92	0.0
LIQV. (BLS)		
	16.71	0.0
COAL SAVINGS (SOURCE)		
	-156.51	0.0
(10**12 BTU)		
	-7.26	0.0
(10**6 TONS)		

SELECTED NON
TECHNOLOGY COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE 0.166 0.0
SOURCE 0.166 0.0

U/UI(0) 0.0 1.000

ECS FUEL/UI(0) 0.060 0.0

F/UI(0) 1.186 1.462

SPECIFIED FUEL/UI(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

1.0 0.0

ECS SIZE (MW)

23.45 0.0

NO. OF UNITS

4.0 0.0

ECS ELECTRICAL EFF-EAE

0.377 0.0

SENSIBLE WASTE HEAT RATIO--A

0.052 0.0

AVEL WASTE HEAT RATIO,R'--HG
(NON ADDITIVE)

0.0 0.0

AVEL WASTE HEAT RATIO,R'--700

0.0 0.0

AVEL WASTE HEAT RATIO,R'--500

0.109 0.0

AVEL WASTE HEAT RATIO,R'--300

0.019 0.0

AVEL WASTE HEAT RATIO,R'--HH

0.584 0.0

TOTAL R

0.712 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R--700

0.0 0.0

RECOV WASTE HEAT RATIO,R--500

0.109 0.0

RECOV WASTE HEAT RATIO,R--300

0.019 0.0

RECOV WASTE HEAT RATIO,R--HH

0.794 0.0

TOTAL R

0.932 0.0

AUXILIARY POWER REQUIRED(KW)

7205. 5093.

AUX THERMAL REQ(10**6 BTU)

0. 22.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL UI(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITOL COST ACCOUNTING FOR TYPICAL PLANT
(\$ 000)

COST CATEGORY	***** SELECTED TECHNOLOGY ***			NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE					
1.1 FUEL STORAGE AND RETRIEVAL	6189.	3373.	9561.	1842.	
1.2 LIMESTONE STORAGE AND RETRIEVAL	1262.	1201.	2462.	0.	
1.3 WASTE HANDLING SYSTEMS	427.	61.	488.	0.	
SUB-TOTAL	7877.	4634.	12511.	1842.	
2. ECS HEAT SOURCE					
2.1 HEAT SOURCE	15072.	8502.	23574.	0.	
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.	
2.3 FEED WATER SYSTEMS	820.	419.	1240.	1753.	
2.4 GASIFIER(ECS)	0.	0.	0.	0.	
SUB-TOTAL	15892.	8921.	24813.	1753.	
3. ENERGY CONVERSION SYSTEM(ECS)					
3.1 PRIMARY ENERGY CONVERTER	12189.	606.	12794.	0.	
3.2 PRIMARY GENERATOR/INVERTER	2081.	0.	2081.	0.	
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.	
3.4 SECONDARY GENERATOR	0.	0.	0.	0.	
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.	
3.6 HEAT RECOVERY EQUIPMENT	4406.	0.	4406.	0.	
3.7 CONDENSERS	0.	0.	0.	0.	
3.8 HEAT PUMP	0.	0.	0.	0.	
SUB-TOTAL	18676.	606.	19282.	0.	
4. THERMAL STORAGE	0.	0.	0.	0.	
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	4565.	1545.	6110.	8948.	
6. HEAT REJECTION	785.	440.	1225.	0.	
7. OTHER BALANCE OF PLANT ITEMS					
7.1 SITE PREPARATION	0.	653.	653.	139.	
7.2 STRUCTURES	1249.	0.	1249.	1236.	
7.3 ELECTRICAL CONDITIONING & CONTROL	62.	93.	155.	113.	
SUB-TOTAL	1311.	747.	2058.	1468.	
8. INDIRECT COSTS					
8.1 CONTINGENCY	9821.	3379.	13200.	2606.	
8.2 ENGINEERING AND FEES	7366.	2534.	9900.	2105.	
SUB-TOTAL	17187.	5912.	23100.	4911.	
TOTAL CAPITAL COST ESTIMATE	66294.	22805.	89099.	18942.	
CONSTRUCTION TIME(YEARS)	0.	3.	3.	0.	
CAPITAL COST EXPENDITURE	71166.	24481.	95648.	19018.	

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.	37873.
COAL	31630.	0.
OTHER	0.	0.
LIMESTONE/DOLOMITE	1542.	0.
TOTAL FUEL COST	33172.	37878.

ELECTRICITY
STAND-BY CHARGE
O & M COST

ELECTRICITY	0.	26468.
STAND-BY CHARGE	0.	0.
O & M COST	5338.	618.
TOTAL OPERATING COSTS	38510.	64963.

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST

LEVELIZED OPERATING COSTS	42400.	72877.
LEVELIZED FIXED CHARGES	9660.	1921.
LEVELIZED ANNUAL COST	52061.	74798.
COST SAVINGS	22737.	0.
COST SAVINGS RATIO	0.504	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	8214.945	4788.539
NITROGEN OXIDES	3119.053	2905.667
HYDROCARBONS	96.502	116.227
PARTICULATES	835.765	501.133
SUBTOTAL	12266.258	8391.562

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	0.0	4881.945
NITROGEN OXIDES	0.0	2847.802
HYDROCARBONS	0.0	569.561
PARTICULATES	0.0	406.829
SUBTOTAL	0.0	8706.133

TOTAL

12266.258	17097.695
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EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.151	0.0
NITROGEN OXIDES	0.453	0.0
HYDROCARBONS	0.859	0.0
PARTICULATES	0.154	0.0

TOTAL

0.693	0.0
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ENVIRONMENTAL IMPACT

136769.562	0.0
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CAP. 112 INDUSTRY-1, REFINED PAPER, STRATEGY-MATCH-1, OWNED SHIP--INDUSTRIAL
 FUEL-1 ADVANCED TECHNOLOGY, STEELING, COAL (AFB)

START-UP DATE = 1980.
 BASE YEAR OF COST ESTIMATES = 1970.

DEPRECIATION-SUM-UP-FIVE-YEAR DUALS METHOD

AFTER-TAX COST-UP-CAPITAL = 5.3%
 FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%
 GENERAL INFLATION RATE = 0.0%

	NONCOGEN	COGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	19018.	95648.
LIFE-CYCLE COST (THOUSANDS OF DOLLARS)	1109726.	770931.
APPROXIMATED COSTS (THOUSANDS OF DOLLARS)		
FIXED PORTION	1912.	9618.
NATURAL GAS	0.	0.
DISTILLATE	0.	0.
RESIDUAL	42716.	0.
COAL	0.	35671.
COAL GAS & OTHER	0.	0.
ELECTRICITY	29849.	0.
HEAT, PLS, ETC.	618.	6800.
TOTAL SYSTEM	75095.	52169.

LEVELIZE ANNUAL COST SAVINGS RATIO = 0.305

ANNUAL OUTPUT 819933 (TONS)
 LEVELIZED ENERGY COST (\$/TON) *

91.59 63.63
 91.59 63.63

UNDISCOUNTED PAYBACK PERIOD

4.1 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 23.1 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(COGEN, ALSO IN COGEN, - (THOUSANDS OF DOLLARS)) = 166308.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND LIVES ANNUALLY AT THE GENERAL INFLATION RATE

COST OF FUEL	3.1 %	EFFECTIVE TAX RATE	50. %
COST OF COGEN. FUEL	7.2 %	ECONOMIC LIFE	30. YRS
COST OF DEFERRED EQUITY	0.2 %	TAX LIFE	15. YRS
COST CAPITALIZATION	30.4 %	INVESTMENT TAX CREDIT	10. %
COMMON STOCK CAPITALIZATION	70.7 %	INSURANCE & OTHER TAXES	3. %
DEFERRED STOCK CAPITALIZATION	0.4 %	INCREMENTAL CAPITAL INV.	0. %

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 OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO. 8 SIC 2631 CORRUGATED PAPER MILL TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO. 34 ADVANCED TECHNOLOGY, THERMIONICS, COAL DERIVED BOILER GRADE

	SELECTED TECHNOLOGY	NON- COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	143.37
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	96.92
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	382.68	0.0
COAL	0.0	265.49
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	382.68	505.78
SOURCE	546.85	505.78
IND BYPRODUCT FUEL (10**12 BTU)		
	300.15	300.15
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	19.12	19.26
(10**12 BTU) FUEL ENERGY	374.94	205.42
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	19.26
(10**12 BTU) FUEL ENERGY	0.0	205.42
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	123.10	0.0
SOURCE	-41.07	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	240.29	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	143.37	0.0
(10**9 CU FT)	154.13	0.0
OIL SAVINGS		
(10**12 BTU)	96.92	0.0
EQUIV. EELS	16.71	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-201.36	0.0
(10**6 TONS)	-13.05	0.0

SELECTED NON
TECHNOLOGY COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.243 0.0
-0.081 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 1.825 0.0

F/U(0) 0.039 1.462

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

1.0 0.0

ECS SIZE (MW)

45.49 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-EAE

0.174 0.0

SENSIBLE WASTE HEAT RATIO--A

0.947 0.0

AVEL WASTE HEAT RATIO,R'--HG
(INCL ADDITIVE)

0.414 0.0

AVEL WASTE HEAT RATIO,R'--700

0.621 0.0

AVEL WASTE HEAT RATIO,R'--500

0.157 0.0

AVEL WASTE HEAT RATIO,R'--300

0.117 0.0

AVEL WASTE HEAT RATIO,R'--HM

0.0 0.0

TOTAL R

0.895 0.0

REC'D WASTE HEAT RATIO,R'--HG

0.0 0.0

REC'D WASTE HEAT RATIO,R'--700

0.0 0.0

REC'D WASTE HEAT RATIO,R'--500

0.615 0.0

REC'D WASTE HEAT RATIO,R'--300

0.200 0.0

REC'D WASTE HEAT RATIO,R'--HM

0.0 0.0

TOTAL R

0.895 0.0

AUXILIARY POWER REQUIRED(MW)

4410. 5098.

ANK THERMAL REQ(10⁶ BTU)

74. 22.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)				
COST CATEGORY	***** EQUIPMENT	SELECTED TECHNOLOGY INSTALLATION	*** TOTAL	NON-COGEN TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	1781.	267.	2048.	1842.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	23.	3.	27.	0.
SUB-TOTAL	1804.	271.	2075.	1842.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	20379.	7497.	27876.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	482.	205.	688.	1753.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	20861.	7703.	28564.	1753.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	33972.	1901.	35872.	0.
3.2 PRIMARY GENERATOR/INVERTER	4650.	396.	5045.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	0.	0.	0.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	38621.	2297.	40918.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	2694.	825.	3519.	8948.
6. HEAT REJECTION	0.	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	760.	760.	139.
7.2 STRUCTURES	822.	0.	822.	1236.
7.3 ELECTRICAL CONDITIONING & CONTROL	39.	59.	98.	113.
SUB-TOTAL	861.	819.	1681.	1468.
8. INDIRECT COSTS				
8.1 CONTINGENCY	12969.	2363.	15331.	2806.
8.2 ENGINEERING AND FEES	9726.	1787.	11513.	2105.
SUB-TOTAL	22695.	4170.	26865.	4911.
TOTAL CAPITAL COST ESTIMATE	87536.	16094.	103620.	18942.
CONSTRUCTION TIME(YEARS)	0.	3.	3.	0.
CAPITAL COST EXPENDITURE	93671.	17211.	110882.	19019.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	49399.	37878.
COAL	0.	0.
OTHER	0.	0.
LIMESTONE/DOLOMITE	0.	0.
TOTAL FUEL COST	49399.	37878.

ELECTRICITY
STAND-BY CHARGE
O & M COST

0.	26468.
2127.	618.

TOTAL OPERATING COSTS

51526.	64963.
--------	--------

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

57602.	72877.
11199.	1921.
68801.	74799.
5997.	0.
0.080	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	6245.137	4768.539
NITROGEN OXIDES	3789.527	2905.667
HYDROCARBONS	151.581	116.327
PARTICULATES	757.905	581.133
SUBTOTAL	10944.141	8391.562

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	0.0	4881.945
NITROGEN OXIDES	0.0	2847.802
HYDROCARBONS	0.0	569.561
PARTICULATES	0.0	406.829
SUBTOTAL	0.0	8706.133

TOTAL

10944.141	17097.695
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EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE	0.354	0.0
NITROGEN OXIDES	0.341	0.0
HYDROCARBONS	0.779	0.0
PARTICULATES	0.233	0.0

TOTAL

0.360	0.0
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SOLID WASTES

374.492	0.0
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CASE 116, INDUSTRY-GENERATED POWER STRATEGY-OF-TIME4 DATES 2014--INDUSTRIAL
100% ADVANCED TECHNOLOGY, ELECTRONICS, COOL DERIVED POWER GRADE

START-UP DATE = 1980.
CASE YEAR UP COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.24
FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.14
GENERAL INFLATION RATE = 0.07

	NONCOGEN	COGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	19018.	111473.
LIFE-CYCLE COST (THOUSANDS OF DOLLARS)	1704726.	1039075.
ANNUALIZED COSTS (THOUSANDS OF DOLLARS)		
FIXED PORTION	1412.	11210.
NATURAL GAS		0.
RESCALATION RATE = 3.6%		0.
DISTILLATE		0.
RESCALATION RATE = 1.0%		0.
RESIDUAL	42716.	55988.
RESCALATION RATE = 1.0%		0.
COAL GAS & OTHER		0.
RESCALATION RATE = 1.0%		0.
ELECTRICITY	29849.	-411.
RESCALATION RATE = 1.0%		2174.
DEM, INS, ETC.	618.	
TOTAL SYSTEM	75055.	68951.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.062

ANNUAL OUTPUT 819932. (TONS)

LEVELIZED ENERGY COST (\$/TON) *

UNIT ENERGY COST (\$/TON) **

91.59 84.11
91.59 84.11

UNDISCOUNTED PAYBACK PERIOD

= 8.3 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 10.2 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(COGEN, MINUS NONCOGEN) - (THOUSANDS OF DOLLARS) = 45612.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN ONGOING VALUE IN TERMS OF CONSTANT PURCHASING
POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF UNIT	= 5.24	EFFECTIVE TAX RATE	= 50.24
COST OF COMMON EQUITY	= 7.24	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0.4	TAX LIFE	= 15. YRS
DEBT CAPITALIZATION	= 30.24	INVESTMENT TAX CREDIT	= 10.24
COMMON STOCK CAPITALIZATION	= 70.24	INSURANCE & OTHER TAXES	= 3.24
DEFERRED STOCK CAPITALIZATION	= 0.24	INCREMENTAL CAPITAL INV.	= 0.24

ORIGINAL PAGE IS
OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO.10 SIC 2812 CHLORINE/CAUSTIC PRODUCTION TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO.10 ADVANCED TECHNOLOGY,DIESEL,LOW SPEED,COAL DERIVED BOILER GRD

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	46.39
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	20.93
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	473.11	0.0
COAL	0.0	601.53
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	473.11	668.86
SOURCE	676.08	668.86
IND BYPRODUCT FUEL (10**12 BTU)		
	48.72	12.18
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)		
	46.90	46.80
(10**12 BTU) FUEL ENERGY		
	421.17	499.13
ELECTRICITY PURCHASED (10**9 KWH)		
	0.0	46.80
(10**12 BTU) FUEL ENERGY		
	0.0	499.13
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	195.75	0.0
SOURCE	-7.22	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	67.33	0.0
NATURAL GAS SAVINGS (10**12 BTU)		
	46.39	0.0
(10**9 CU FT)		
	49.87	0.0
OIL SAVINGS (10**12 BTU)		
	20.93	0.0
EQUIV. BBL'S		
	3.61	0.0
COAL SAVINGS (SOURCE)		
	-74.54	0.0
(10**12 BTU)		
	-3.46	0.0
(10**6 TONS)		

SELECTED TECHNOLOGY NON
COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE 0.293 0.0
SOURCE -0.011 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.844 0.0

F/U(0) 0.104 0.340

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

1.0 0.0

ECS SIZE (MW)

22.50 0.0

NO. OF UNITS

4.0 0.0

ECS ELECTRICAL EFF-EAE

0.390 0.0

SENSIBLE WASTE HEAT RATIO--A

0.912 0.0

AVBL WASTE HEAT RATIO, R'--HG
(NON ADDITIVE)

0.752 0.0

AVBL WASTE HEAT RATIO, R'--700

0.0 0.0

AVBL WASTE HEAT RATIO, R'--500

0.075 0.0

AVBL WASTE HEAT RATIO, R'--300

0.331 0.0

AVBL WASTE HEAT RATIO, R'--HW

0.247 0.0

TOTAL R

0.654 0.0

RECOV WASTE HEAT RATIO, R--HG

0.0 0.0

RECOV WASTE HEAT RATIO, R--700

0.0 0.0

RECOV WASTE HEAT RATIO, R--500

0.075 0.0

RECOV WASTE HEAT RATIO, R--300

0.225 0.0

RECOV WASTE HEAT RATIO, R--HW

0.006 0.0

TOTAL R

0.307 0.0

AUXILIARY POWER REQUIRED(KW)

910. 727.

AUX THERMAL REQ(10**6 BTU)

11. 1.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)				
COST CATEGORY	**** EQUIPMENT	SELECTED TECHNOLOGY INSTALLATION	*** TOTAL	NON-COGEN TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	767.	100.	867.	353.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	767.	100.	867.	353.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	94.	38.	132.	263.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	94.	38.	132.	263.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	32402.	720.	33122.	0.
3.2 PRIMARY GENERATOR/INVERTER	7651.	0.	7651.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 EDITCHING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	5873.	0.	5873.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	45926.	720.	46646.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	523.	158.	681.	1351.
6. HEAT REJECTION	584.	337.	922.	0.
7. OTHER BALANCE OF PLANT IT: IS				
7.1 SITE PREPARATION	0.	548.	548.	22.
7.2 STRUCTURES	5528.	0.	5528.	211.
7.3 ELECTRICAL CONDITIONING & CONTROL	8.	12.	21.	16.
SUB-TOTAL	5536.	560.	6097.	249.
8. INDIRECT COSTS				
8.1 CONTINGENCY	10686.	383.	11069.	443.
8.2 ENGINEERING AND FEES	8015.	287.	8302.	332.
SUB-TOTAL	18701.	670.	19371.	776.
TOTAL CAPITAL COST ESTIMATE	72131.	2584.	74716.	2992.
CONSTRUCTION TIME(YEARS)	0.	1.	1.	0.
CAPITAL COST EXPENDITURE	73283.	2647.	76530.	3004.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS		-----	
OPERATING COSTS 1990. (K\$/YR)			
NATURAL GAS	0.	0.	0.
PETROLEUM DISTILLATE	0.	0.	0.
PETROLEUM RESIDUAL	0.	0.	0.
COAL GAS	0.	0.	0.
COAL DERIVED DISTILLATE	0.	0.	0.
COAL DERIVED RESIDUAL	24627.	8571.	8571.
COAL	0.	0.	0.
OTHER	0.	0.	0.
LIMESTONE/DOLOMITE	0.	0.	0.
TOTAL FUEL COST	24627.	8571.	8571.
ELECTRICITY	0.	25933.	
STAND-BY CHARGE	0.	6.	
O & M COST	1160.	87.	
TOTAL OPERATING COSTS	25794.	34591.	
LEVELIZED OPERATING COSTS	20023.	30835.	
LEVELIZED FIXED CHARGES	7730.	303.	
LEVELIZED ANNUAL COST	36553.	39138.	
COST SAVINGS	2595.	0.	
COST SAVINGS RATIO	0.066	0.0	
ENVIRONMENTAL IMPACT			
PLANT EMISSIONS(TON/YR)			
SULFUR DIOXIDE	3113.333	1003.537	
NITROGEN OXIDES	12595.167	657.486	
HYDROCARBONS	590.096	26.299	
PARTICULATES	81.841	131.497	
SUBTOTAL	16360.453	1699.820	
UTILITY EMISSIONS(TON/YR)			
SULFUR DIOXIDE	0.0	4783.320	
NITROGEN OXIDES	0.0	2790.276	
HYDROCARBONS	0.0	559.055	
PARTICULATES	0.0	393.611	
SUBTOTAL	0.0	8530.266	
TOTAL	16360.453	10429.082	
EMISSIONS SAVINGS RATIO			
SULFUR DIOXIDE	0.469	0.0	
NITROGEN OXIDES	-2.650	0.0	
HYDROCARBONS	0.007	0.0	
PARTICULATES	0.646	0.0	
TOTAL	-0.569	0.0	
SOLID WASTES	0.0	0.0	

Power Systems Division

FCR-1333

CASE 40 INDUSTRY - FLOWING STRATEGY-MATCH-E OWNER-JEP--INDUSTRIAL
 NO.10 ADVANCED TECHNOLOGY OVER SEULUM SPEED-COAL DERIVED MILLER GRD

START-UP DATE = 1996.
 BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.3%
 FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%
 GENERAL INFLATION RATE = 0.0%

NONCOGEN COGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 300% 76530.

LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 580770. 541393.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION	302.	76530.
NATURAL GAS	0.	0.
WATER	0.	0.
RESIDUAL	9666.	27773.
COAL	0.	0.
COAL GAS & OTHER	0.	0.
ELECTRICITY	29246.	0.
DEWATERING, ETC.	67.	1168.

TOTAL SYSTEM 39301. 36636.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.068

ANNUAL OUTPUT	268333. (TONS)
LEVELIZED ENERGY COST (\$/TON) *	146.46 136.53
UNIT ENERGY COST (\$/TON) **	146.46 136.53

UNDISCOUNTED PAYBACK PERIOD = 9.8 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 8.1 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW
 (COGEN. MINUS NONCOGEN.) - (THOUSANDS OF DOLLARS) = 18499.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 3.4	EFFECTIVE TAX RATE	= 90.4
COST OF COMMON EQUITY	= 7.8	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0.4	TAX LIFE	= 15. YRS
DEBT CAPITALIZATION	= 30.4	INVESTMENT TAX CREDIT	= 10.4
COMMON STOCK CAPITALIZ.	= 70.4	INSURANCE & OTHER TAXES	= 3.4
PREFERRED STOCK CAPITALIZ.	= 0.4	INCREMENTAL CAPITAL INV.	= 0.4

AVERAGE ENERGY REQUIREMENTS

NO.10 SIC 2812 CHLORINE/CAUSTIC PRODUCTION TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO.13 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL DER.BLR GRD

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	46.39
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	20.93
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	432.36	0.0
COAL	0.0	601.53
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	432.36	668.86
SOURCE	617.84	668.86
IND BYPRODUCT FUEL (10**12 BTU)		
	46.72	12.16
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	46.52	46.80
(10**12 BTU) FUEL ENERGY	432.36	499.13
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	46.80
(10**12 BTU) FUEL ENERGY	0.0	499.13
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	236.50	0.0
SOURCE	51.02	0.0
TOT OIL AND GAS S.AVE(10**12 BTU)		
	67.33	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	46.39	0.0
(10**9 CU FT)	49.87	0.0
OIL SAVINGS		
(10**12 BTU)	20.93	0.0
EQUIV. BBLs	3.61	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-16.31	0.0
(10**6 TONS)	-0.76	0.0

FUEL ENERGY UTILIZATION RATIOS FUEL ENERGY SAVINGS RATIO SITE SOURCE	SELECTED TECHNOLOGY		NON COGENERATION	
U/U(0)	0.354	0.076	0.0	0.0
ECS FUEL/U(0)	0.0	0.0	1.000	0.0
F/U(0)	0.0	0.0	0.340	0.0
SPECIFIED FUEL/U(0)	0.0	0.0	0.0	0.0
ENERGY CONVERSION SYSTEM DATA DESIGN OPTION	3.0	0.0	0.0	0.0
ECS SIZE (MW)	44.64	0.0	0.0	0.0
NO. OF UNITS	2.0	0.0	0.0	0.0
ECS ELECTRICAL EFF-EAE	0.330	0.0	0.0	0.0
SENSIBLE WASTE HEAT RATIO--A	0.923	0.0	0.0	0.0
AVBL WASTE HEAT RATIO,R'---HG (NON ADDITIVE)	1.000	0.0	0.0	0.0
AVBL WASTE HEAT RATIO,R'-700	0.539	0.0	0.0	0.0
AVBL WASTE HEAT RATIO,R'-500	0.136	0.0	0.0	0.0
AVBL WASTE HEAT RATIO,R'-300	0.101	0.0	0.0	0.0
AVBL WASTE HEAT RATIO,R'---HW	0.008	0.0	0.0	0.0
TOTAL R	0.784	0.0	0.0	0.0
RECOV WASTE HEAT RATIO,R'---HG	0.0	0.0	0.0	0.0
RECOV WASTE HEAT RATIO,R'-700	0.0	0.0	0.0	0.0
RECOV WASTE HEAT RATIO,R'-500	0.353	0.0	0.0	0.0
RECOV WASTE HEAT RATIO,R'-300	0.173	0.0	0.0	0.0
RECOV WASTE HEAT RATIO,R'---HW	0.005	0.0	0.0	0.0
TOTAL R	0.531	0.0	0.0	0.0
AUXILIARY POWER REQUIRED(KW)	184.	727.		
AUX THERMAL REQ(10**6 BTU)	6.	1.		
COP OF HEAT PUMP	0.0	0.0		

F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

U(0) = UTILITY FUEL (NON-COGENERATION)

U = UTILITY FUEL

CAPITOL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)			
COST CATEGORY	**** SELECTED TECHNOLOGY *** EQUIPMENT INSTALLATION	NON-COGEN TOTAL	NON-COGEN TOTAL
1. FUEL/WASTE HANDLING AND STORAGE			
1.1 FUEL STORAGE AND RETRIEVAL	722.	94.	815.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.
SUB-TOTAL	722.	94.	815.
2. ECS HEAT SOURCE			
2.1 HEAT SOURCE	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.
2.3 FEED WATER SYSTEMS	0.	0.	263.
2.4 GASIFIER(ECS)	0.	0.	0.
SUB-TOTAL	0.	0.	263.
3. ENERGY CONVERSION SYSTEM(ECS)			
3.1 PRIMARY ENERGY CONVERTER	4925.	2068.	6993.
3.2 PRIMARY GENERATOR/INVERTER	3102.	0.	3102.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.
3.5 BOTTLING CYCLE VAPOR GENERATOR	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	1442.	460.	1902.
3.7 CONDENSERS	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.
SUB-TOTAL	9469.	2528.	11997.
4. THERMAL STORAGE	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	0.	0.	1351.
6. HEAT REJECTION	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS			
7.1 SITE PREPARATION	0.	128.	128.
7.2 STRUCTURES	0.	0.	211.
7.3 ELECTRICAL CONDITIONING & CONTROL	2.	3.	16.
SUB-TOTAL	2.	131.	249.
8. INDIRECT COSTS			
8.1 CONTINGENCY	2039.	550.	2589.
8.2 ENGINEERING AND FEES	1529.	413.	1942.
SUB-TOTAL	3567.	963.	4531.
TOTAL CAPITAL COST ESTIMATE	13760.	3716.	17476.
CONSTRUCTION TIME(YEARS)	0.	1.	0.
CAPITAL COST EXPENDITURE	14094.	3006.	17900.
			300%.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS		-----	
OPERATING COSTS 1990. (K\$/YR)			
NATURAL GAS	0.	0.	0.
PETROLEUM DISTILLATE	0.	0.	0.
PETROLEUM RESIDUAL	0.	0.	0.
COAL GAS	0.	0.	0.
COAL DERIVED DISTILLATE	0.	0.	0.
COAL DERIVED RESIDUAL	22505.	6571.	6571.
COAL	0.	0.	0.
OTHER	0.	0.	0.
LIMESTONE/DOLomite	0.	0.	0.
TOTAL FUEL COST	22505.	6571.	6571.
ELECTRICITY	0.	25933.	25933.
STAND-BY CHARGE	0.	0.	0.
O & M COST	2000.	87.	87.
TOTAL OPERATING COSTS	24506.	34591.	34591.
LEVELIZED OPERATING COSTS	27354.	36835.	36835.
LEVELIZED FIXED CHARGES	1608.	303.	303.
LEVELIZED ANNUAL COST	29162.	39130.	39130.
COST SAVINGS	9976.	0.	0.
COST SAVINGS RATIO	0.255	0.0	0.0
ENVIRONMENTAL IMPACT			

PLANT EMISSIONS(TON/YR)			
SULFUR DIOXIDE	2831.357	1003.537	1003.537
NITROGEN OXIDES	1726.437	657.406	657.406
HYDROCARBONS	69.057	26.299	26.299
PARTICULATES	345.200	131.497	131.497
SUBTOTAL	4972.133	1898.820	1898.820
UTILITY EMISSIONS(TON/YR)			
SULFUR DIOXIDE	0.0	4793.320	4793.320
NITROGEN OXIDES	0.0	2790.276	2790.276
HYDROCARBONS	0.0	550.055	550.055
PARTICULATES	0.0	398.611	398.611
SUBTOTAL	0.0	8530.266	8530.266
TOTAL	4972.133	10429.082	10429.082
EMISSIONS SAVINGS RATIO			
SULFUR DIOXIDE	0.517	0.0	0.0
NITROGEN OXIDES	0.499	0.0	0.0
HYDROCARBONS	0.862	0.0	0.0
PARTICULATES	0.349	0.0	0.0
TOTAL	0.523	0.0	0.0
SOLID WASTES	0.0	0.0	0.0

CASE 55 INDUSTRY - FLOWING STRATEGY-UP TITUM OWNED - JIP--INDUSTRIAL
 101-13 ADVANCED TECHNOLOGY GAS LUBING DIRECT FIRED, COAL OF K. M. R. GAS

START-UP DATE = 1990.
 BASE YEAR OF COST ESTIMATES = 1976.

DEPRECIATION-SUM-OF-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.3%
 FIRED CHARGE RATE ON INVESTMENT CAPITAL = 10.1%
 GENERAL INFLATION RATE = 0.08

NONCNGEN CNGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 3004. 17900.
 LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 980770. 432405.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FUELED PARTITION	302.	1800.
NATURAL GAS	0.	0.
DISTILLATE	0.	0.
RESIDUAL	9666.	25380.
COAL	0.	0.
COAL GAS & OTHER	0.	0.
ELECTRICITY	29246.	0.
OGW, INS, ETC.	87.	2080.

TOTAL SYSTEM

39301. 29261.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.255

ANNUAL INPUT 268333. (TONS)

LEVELIZED ENERGY COSTS/TON *

UNIT ENERGY COSTS/TON **

146.46 109.05
 146.46 109.05

UNDISCOUNTED PAYBACK PERIOD = 2.3 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 41.2 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(CNGEN. MINUS NONCNGEN. - (THOUSANDS OF DOLLARS)) = 73116.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN INCHANGING VALUE IN TERMS OF CONSTANT PURCHASING POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 3.2	EFFECTIVE TAX RATE	= 50.2
COST OF COMMON EQUITY	= 7.2	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0.2	TAX LIFE	= 15. YRS
DEBT CAPITALIZATION	= 30.2	INVESTMENT TAX CREDIT	= 10.2
COMMON STOCK CAPITALIZ.	= 70.2	INSURANCE & OTHER TAXES	= 3.2
PREFERRED STOCK CAPITALIZ.	= 0.2	INCREMENTAL CAPITAL INV.	= 0.2

ORIGINAL PAGE IS
 OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO.10 SIC 2812 CHLORINE/CAUSTIC PRODUCTION TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO.20 ADVANCED TECHNOLOGY, STEAM INJECT. 6/7, DIR. FIRED, COAL DER. D.G.

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	46.39
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	20.93
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	419.93	0.0
COAL	0.0	601.53
OTHER	0.0	0.0
TOT FUEL CONSUMPTION (10**12 BTU)		
SITE	419.93	648.06
SOURCE	600.08	648.06
IND BYPRODUCT FUEL (10**12 BTU)		
	40.72	12.10
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)		
	46.52	46.00
(10**12 BTU) FUEL ENERGY		
	419.93	499.13
ELECTRICITY PURCHASED (10**9 KWH)		
	0.0	46.00
(10**12 BTU) FUEL ENERGY		
	0.0	499.13
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	240.93	0.0
SOURCE	60.78	0.0
TOT OIL AND GAS SAVE (10**12 BTU)		
	67.33	0.0
NATURAL GAS SAVINGS (10**12 BTU)		
	46.39	0.0
(10**9 CU FT)		
	49.07	0.0
OIL SAVINGS (10**12 BTU)		
	20.93	0.0
EQUIV. BBL'S		
	3.61	0.0
COAL SAVINGS (SOURCE)		
	1.45	0.0
(10**12 BTU)		
	0.07	0.0
(10**6 TONS)		

SELECTED TECHNOLOGY NON COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.372 0.0
0.103 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.041 0.0

F/U(0) 0.0 0.340

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

2.0 0.0

ECS SIZE (MW) 44.64 0.0

NO. OF UNITS 2.0 0.0

ECS ELECTRICAL EFF-ETAE 0.340 0.0

SENSIBLE WASTE HEAT RATIO--A 0.921 0.0

AVBL WASTE HEAT RATIO.R'--HG 0.551 0.0

(NCH ADDITIVE)

AVBL WASTE HEAT RATIO.R'--700 0.302 0.0

AVBL WASTE HEAT RATIO.R'--500 0.097 0.0

AVBL WASTE HEAT RATIO.R'--300 0.072 0.0

AVBL WASTE HEAT RATIO.R'--HJ 0.0 0.0

TOTAL R 0.551 0.0

RECOV WASTE HEAT RATIO.R--HG 0.0 0.0

RECOV WASTE HEAT RATIO.R--700 0.0 0.0

RECOV WASTE HEAT RATIO.R--500 0.370 0.0

RECOV WASTE HEAT RATIO.R--300 0.101 0.0

RECOV WASTE HEAT RATIO.R--HJ 0.0 0.0

TOTAL R 0.551 0.0

AUXILIARY POWER REQUIRED(MW) 179. 727.

AUX THERMAL REQ(10**6 BTU) 6. 1.

COP OF HEAT PUMP 0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT (\$ 000)				
COST CATEGORY	SELECTED TECHNOLOGY EQUIPMENT	INSTALLATION	NON-COGEN TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	704	91.	795.	383.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	704.	91.	795.	383.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	0.	0.	0.	263.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	0.	0.	0.	263.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	4540.	2060.	6436.	0.
3.2 PRIMARY GENERATOR/INVERTER	3102.	0.	3102.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	2016.	692.	2708.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	9606.	2760.	12466.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	0.	0.	0.	1351.
6. HEAT REJECTION	0.	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	132.	132.	22.
7.2 STRUCTURES	0.	0.	0.	211.
7.3 ELECTRICAL CONDITIONING & CONTROL	2.	2.	4.	16.
SUB-TOTAL	2.	135.	137.	249.
8. INDIRECT COSTS				
8.1 CONTINGENCY	2070.	597.	2675.	443.
8.2 ENGINEERING AND FEES	1559.	440.	2007.	332.
SUB-TOTAL	3637.	1045.	4682.	776.
TOTAL CAPITAL COST ESTIMATE	14026.	4031.	18059.	2992.
CONSTRUCTION TIME(YEARS)	0.	1.	1.	0.
CAPITAL COST EXPENDITURE	14349.	4120.	18497.	3004.

SELECTED NON
TECHNOLOGY CONGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/TR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	21859.	8871.
COAL	0.	0.
OTHER	0.	0.
LIVESTONE/DOLomite	0.	0.
TOTAL FUEL COST	21859.	8871.

ELECTRICITY
STAND-BY CHARGE
O & M COST

0.
0.
1932.

25933.
0.
87.

TOTAL OPERATING COSTS

23790.

34591.

LEVELIZED OPERATING COSTS

LEVELIZED FIXED CHARGES

LEVELIZED ANNUAL COST

COST SAVINGS

COST SAVINGS RATIO

26479.
1040.
28347.
10791.
0.276

30035.
303.
39130.
0.
0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS (TON/TR)

SULFUR DIOXIDE
NITROGEN OXIDES
HYDROCARBONS
PARTICULATES
SUBTOTAL

2749.902
1676.818
67.873
335.364
4829.230

1003.537
657.406
26.299
131.497
1898.829

UTILITY EMISSIONS (TON/TR)

SULFUR DIOXIDE
NITROGEN OXIDES
HYDROCARBONS
PARTICULATES
SUBTOTAL

0.0
0.0
0.0
0.0
0.0

4703.328
2790.276
550.855
390.411
8530.266

TOTAL

4829.230

10429.082

EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE

NITROGEN OXIDES

HYDROCARBONS

PARTICULATES

TOTAL

0.531
0.515
0.005
0.367
0.537

0.0
0.0
0.0
0.0
0.0

SOLID WASTES

0.0

0.0

CASE: IN INDUSTRIAL - SIMPLIFIED STRATEGY-INDUSTRIAL INDE JNIP--INDUSTRIAL
 UNL20 AVAILABLE FROM 1970 TO 1980 INFLATION 10.0% PER ANNUAL INFL. N.G.

START-UP RATE = 150C.

BASE YEAR IN COST ESTIMATES = 1970.

DEPRECIATION-SIM-DE-INC-YEARS DEDUCT IN INDE

RETURN-TAX COST-UP-CAPITAL = 5.0%

FIXED CHARGE RATE IN INVESTMENT CAPITAL = 10.17

GENERAL INFLATION RATE = 0.07

MINIMUM CDFM

COGFM

CAPITAL COST (THOUSANDS OF DOLLARS) 3004. 10497.

LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 580770. 420316.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PAYMENT

NATURAL GAS

DISTILLATE

WATER

COAL

CHL GAS & OTHER

ELECTRICITY

WATER, ETC.

TOTAL SYSTEM

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.276

ANNUAL OUTPUT 26333.1 (TENS)

LEVELIZED ENERGY COST (\$/TWH) 146.46 106.00

UNIT ENERGY COST (\$/TWH) 146.46 106.00

UNDISCOUNTED PAYBACK PERIOD 2.3 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 42.6 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(CUMULATIVE, MINUS DISCOUNT, - (THOUSANDS OF DOLLARS)) = 79106.

BASED ON ANNUAL OUTPUT OF PRODUCT

BASED ON INVESTING VALUE IN TERMS OF CONSTANT PURCHASING

POWER AND UNITS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF UNIT

COST OF COMMON EQUITY

COST OF PREFERRED EQUITY

UNIT CAPITALIZATION

COMMON STOCK CAPITALIZATION

PREFERRED STOCK CAPITALIZATION

EFFECTIVE TAX RATE

ECONOMIC LIFE

TAX LIFE

INVESTMENT TAX CREDIT

INSURANCE & OTHER TAXES

INCREMENTAL CAPITAL INW.

ORIGINAL PAGE
 OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO.10 SIC 2812 CHLORINE/CAUSTIC PRODUCTION TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY = NO.30 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP, COAL DER. DIST.

SELECTED NON
TECHNOLOGY COGENERATION

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	44.39
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	20.93
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	392.62	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	0.0	601.53
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	392.62	668.06
SOURCE	604.25	668.06
IND BYPRODUCT FUEL (10**12 BTU)		
	40.72	12.10
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	46.43	46.00
(10**12 BTU) FUEL ENERGY	392.62	499.13
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	46.00
(10**12 BTU) FUEL ENERGY	0.0	499.13
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	276.24	0.0
SOURCE	64.61	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	67.33	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	46.39	0.0
(10**9 CU FT)	49.87	0.0
OIL SAVINGS		
(10**12 BTU)	20.93	0.0
EQUIV. BBLs	3.61	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-2.71	0.0
(10**6 TONS)	-0.13	0.0

SELECTED TECHNOLOGY NON
COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.413 0.0
0.097 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.707 0.0

F/U(0) 0.0 0.340

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

3.0 0.0

ECS SIZE (MW)

44.55 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-ETAE

0.359 0.0

SENSIBLE WASTE HEAT RATIO--A

0.093 0.0

AVBL WASTE HEAT RATIO,R'---HG
(NON ADDITIVE)

0.0 0.0

AVBL WASTE HEAT RATIO,R'--700

0.511 0.0

AVBL WASTE HEAT RATIO,R'--500

0.129 0.0

AVBL WASTE HEAT RATIO,R'--300

0.131 0.0

AVBL WASTE HEAT RATIO,R'---HM

0.157 0.0

TOTAL R 9.928 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R--700

0.0 0.0

RECOV,WASTE HEAT RATIO,R--500

0.416 0.0

RECOV WASTE HEAT RATIO,R--300

0.192 0.0

RECOV WASTE HEAT RATIO,R--HM

0.005 0.0

TOTAL R 0.612 0.0

AUXILIARY POWER REQUIRED(KW)

0. 727.

AUX THERMAL REQ(10**6 BTU)

0. 1.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT
(\$ 000)

***** SELECTED TECHNOLOGY *** NON-COGEN
EQUIPMENT INSTALLATION TOTAL TOTAL

COST CATEGORY

1. FUEL/WASTE HANDLING AND STORAGE	500.	84.	584.	353.
1.1 FUEL STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	500.	84.	584.	353.
SUB-TOTAL				
2. ECS HEAT SOURCE	0.	0.	0.	0.
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	263.
2.3 FEED WATER SYSTEMS	0.	0.	0.	0.
2.4 GASIFIER(ECS)	0.	0.	0.	263.
SUB-TOTAL				
3. ENERGY CONVERSION SYSTEM(ECS)	17989.	891.	18880.	0.
3.1 PRIMARY ENERGY CONVERTER	4455.	0.	4455.	0.
3.2 PRIMARY GENERATOR/INVERTER	0.	0.	0.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	1782.	0.	1782.	0.
3.6 HEAT RECOVERY EQUIPMENT	0.	0.	0.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	24226.	891.	25117.	0.
SUB-TOTAL				
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE,BOILER)	0.	0.	0.	1351.
6. HEAT REJECTION	0.	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS	0.	257.	257.	22.
7.1 SITE PREPARATION	0.	0.	0.	211.
7.2 STRUCTURES	0.	0.	0.	16.
7.3 ELECTRICAL CONDITIONING & CONTROL	0.	257.	257.	249.
SUB-TOTAL				
8. INDIRECT COSTS	4945.	246.	5192.	443.
8.1 CONTINGENCY	3709.	185.	3894.	332.
8.2 ENGINEERING AND FEES	8654.	431.	9085.	775.
SUB-TOTAL				
TOTAL CAPITAL COST ESTIMATE	33360.	1664.	35044.	2992.
CONSTRUCTION TIME(YEARS)	0.	1.	1.	0.
CAPITAL COST EXPENDITURE	34191.	1704.	35895.	3004.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	25052.	0.
COAL DERIVED RESIDUAL	0.	8571.
COAL	0.	0.
OTHER	0.	0.
LIMESTONE/DOLomite	0.	0.
TOTAL FUEL COST	25052.	8571.

ELECTRICITY
STAND-BY CHARGE
O & M COST

0.
0.
1706.

25933.
0.
87.

TOTAL OPERATING COSTS

26757.

34591.

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

29839.
3625.
33464.
5674.
0.145

30835.
303.
39130.
0.
0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE	1787.253	1003.537
NITROGEN OXIDES	272.791	657.466
HYDROCARBONS	0.0	26.299
PARTICULATES	106.608	131.497
SUBTOTAL	2166.653	1898.820

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE	0.0	4783.326
NITROGEN OXIDES	0.0	2790.276
HYDROCARBONS	0.0	558.055
PARTICULATES	0.0	395.611
SUBTOTAL	0.0	8530.266

TOTAL

2166.653

10429.082

EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE
NITROGEN OXIDES
HYDROCARBONS
PARTICULATES

0.695
0.921
1.000
0.799

0.0
0.0
0.0
0.0

TOTAL

0.792

0.0

SOLID WASTES

0.0

0.0

CASE 100 INDUSTRY-CLIMITE STRATEGY-UP JIMM UNWEN-IP--INDUSTRIAL
 NO-20 ADVANCED TECHNOLOGY, FUEL CELL, HIGH TEMP, COAL DER. DIST.

START-UP DATE = 1990.
 BASE YEAR OF COST ESTIMATES = 1976.

DEPRECIATION-SUM-UP-THE-YEARS DIGITS METHOD

AFTER-TAX COST-UP-CAPITAL = 5.38
 FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.18
 GENERAL INFLATION RATE = 0.08

Power Systems Division		
	NONCOGEN	COGEN
CAPITAL COST (THOUSANDS OF DOLLARS)	3004.	35895.
LIFE-CYCLE COST (THOUSANDS OF DOLLARS)	580770.	496043.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION		302.	3610.
NATURAL GAS	ESCALATION RATE = 3.68	0.	0.
DISTILLATE	ESCALATION RATE = 1.08	0.	28252.
RESIDUAL	ESCALATION RATE = 1.08	9666.	0.
COAL	ESCALATION RATE = 1.08	0.	0.
COAL GAS & OTHER	ESCALATION RATE = 1.08	0.	0.
ELECTRICITY	ESCALATION RATE = 1.08	29246.	0.
DEW, INS, ETC.	INFLATION RATE = 0.08	67.	1706.
TOTAL SYSTEM		39301.	33567.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.146

ANNUAL OUTPUT	268333. (TOWS)	146.46	125.10
LEVELIZED ENERGY COST (\$/TON)	*	146.46	125.10
UNIT ENERGY COST (\$/TOW)	**		

UNDISCOUNTED PAYBACK PERIOD = 5.6 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 16.6 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW
 (COGEN. MINUS NONCOGEN. - (THOUSANDS OF DOLLARS)) = 41616.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 3. %	EFFECTIVE TAX RATE	= 50. %
COST OF COMMON EQUITY	= 7. %	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0. %	TAX LIFE	= 15. YRS
DEBT CAPITALIZATION	= 30. %	INVESTMENT TAX CREDIT	= 10. %
COMMON STOCK CAPITALIZ.	= 70. %	INSURANCE & OTHER TAXES	= 3. %
PREFERRED STOCK CAPITALIZ.	= 0. %	INCREMENTAL CAPITAL INV.	= 0. %

FCR-1333

AVERAGE ENERGY REQUIREMENTS

NO.12 SIC 2621 LOW DENSITY POLYETHYLENE TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO.24 ADVANCED TECHNOLOGY, COMB. CYCLE, DIRECT FIRED, COAL DER. B.S.

	SELECTED TECHNOLOGY	NON COGENERATION
FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	13.44
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	4.65
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	115.39	0.0
COAL	0.0	153.79
OTHER	0.0	2.59
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	115.39	174.48
SOURCE	164.89	174.48
IND BYPRODUCT FUEL (10**12 BTU)		
	0.0	0.0
TOTAL ELECTRIC CONSUMPTION		
(10**9 KWH)	13.98	13.94
(10**12 BTU) FUEL ENERGY	114.97	148.62
ELECTRICITY PURCHASED		
(10**9 KWH)	0.0	13.94
(10**12 BTU) FUEL ENERGY	0.0	148.62
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	59.09	0.0
SOURCE	9.58	0.0
TOT OIL AND GAS SAVE(10**12 BTU)		
	18.10	0.0
NATURAL GAS SAVINGS		
(10**12 BTU)	13.44	0.0
(10**9 CU FT)	14.45	0.0
OIL SAVINGS		
(10**12 BTU)	4.65	0.0
EQUIV. BBLs	0.80	0.0
COAL SAVINGS (SOURCE)		
(10**12 BTU)	-11.10	0.0
(10**6 TONS)	-0.51	0.0

SELECTED TECHNOLOGY COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE 0.339 0.0
0.055 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.774 0.0

F/U(0) 0.003 0.174

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

2.0 0.0

ECS SIZE (MW)

16.26 0.0

NO. OF UNITS

2.0 0.0

ECS ELECTRICAL EFF-ETAE

0.415 0.0

SENSIBLE WASTE HEAT RATIO--A

0.905 0.0

AVBL WASTE HEAT RATIO,R'--HG
(NON ADDITIVE)

0.614 0.0

AVBL WASTE HEAT RATIO,R'-700

0.256 0.0

AVBL WASTE HEAT RATIO,R'-500

0.065 0.0

AVBL WASTE HEAT RATIO,R'-300

0.048 0.0

AVBL WASTE HEAT RATIO,R'--HW

0.0 0.0

TOTAL R

0.368 0.0

RECOV WASTE HEAT RATIO,R--HG

0.0 0.0

RECOV WASTE HEAT RATIO,R-700

0.0 0.0

RECOV WASTE HEAT RATIO,R-500

0.269 0.0

RECOV WASTE HEAT RATIO,R-300

0.099 0.0

RECOV WASTE HEAT RATIO,R--HW

0.0 0.0

TOTAL R

0.368 0.0

AUXILIARY POWER REQUIRED(KW)

257. 140.

AUX THERMAL REQ(10**6 BTU)

2. 0.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT
(\$ 000)

COST CATEGORY	SELECTED TECHNOLOGY		NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	283.	36.	319.	97.
1.2 LIMESTONE STORAGE AND RETRIEVAL	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	283.	36.	319.	97.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	0.	0.	0.	63.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	0.	0.	0.	63.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	1640.	772.	2420.	0.
3.2 PRIMARY GENERATOR/INVERTER	1136.	0.	1136.	0.
3.3 SECONDARY ENERGY CONVERTER	2060.	820.	2880.	0.
3.4 SECONDARY GENERATOR	603.	0.	603.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	794.	304.	1100.	0.
3.7 CONDENSERS	170.	44.	222.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	6506.	1951.	8457.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	0.	0.	0.	307.
6. HEAT REJECTION				
7. OTHER BALANCE OF PLANT ITEMS	319.	182.	501.	0.
7.1 SITE PREPARATION	0.	90.	90.	5.
7.2 STRUCTURES	521.	0.	521.	56.
7.3 ELECTRICAL CONDITIONING & CONTROL	4.	7.	12.	6.
SUB-TOTAL	525.	105.	630.	67.
6. INDIRECT COSTS				
6.1 CONTINGENCY	1527.	455.	1981.	107.
6.2 ENGINEERING AND FEES	1145.	341.	1486.	60.
SUB-TOTAL	2672.	796.	3467.	167.
TOTAL CAPITAL COST ESTIMATE	10305.	3069.	13375.	721.
CONSTRUCTION TIME(YEARS)	0.	2.	2.	0.
CAPITAL COST EXPENDITURE	10012.	3220.	14032.	724.

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	0.
COAL DERIVED RESIDUAL	0.177.	1701.
COAL	0.	0.
OTHER	0.	0.
LIMESTONE/DOLomite	0.	0.
TOTAL FUEL COST	0.177.	1701.

ELECTRICITY
STAND-BY CHARGE
O & M COST

0. 10512.
0. 0.
730. 17.

TOTAL OPERATING COSTS

8906. 12310.

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

9912. 13022.
1417. 73.
11329. 13095.
2566. 0.
0.105 0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

SULFUR DIOXIDE 1020.694 225.141
NITROGEN OXIDES 627.241 136.614
HYDROCARBONS 25.090 5.465
PARTICULATES 125.448 27.323
SUBTOTAL 1006.473 394.542

UTILITY EMISSIONS(TON/YR)

SULFUR DIOXIDE 0.0 1930.923
NITROGEN OXIDES 0.0 1131.039
HYDROCARBONS 0.0 226.208
PARTICULATES 0.0 161.577
SUBTOTAL 0.0 3457.746

TOTAL

1006.473 3552.288

EMISSIONS SAVINGS RATIO

SULFUR DIOXIDE 0.525 0.0
NITROGEN OXIDES 0.505 0.0
HYDROCARBONS 0.092 0.0
PARTICULATES 0.336 0.0

TOTAL

0.531 0.0

SOLID WASTES

0.0 0.0

CASE 96 INDUSTRY-AM DENS. POLYETHYL STRATEGY-MATCH-E DMM-JHP--INDUSTRIAL
 40.74 ADVANCED TECHNOLOGY-CUMULATIVE-DIRECT FIRMED-CDAL OFR. P.G.

START-UP DATE = 1990.
 BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.32
 FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.18
 GENERAL INFLATION RATE = 0.08

AMCHOCGEN CHGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 724. 13783.
 LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 206192. 167967.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION	73.	1378.
NATURAL GAS	RESCALATION RATE = 3.0%	0.
DISTILLATE	RESCALATION RATE = 1.0%	0.
RESIDUAL	RESCALATION RATE = 1.0%	2008.
COAL	RESCALATION RATE = 1.0%	0.
COAL GAS & OILMER	RESCALATION RATE = 1.0%	0.
ELECTRICITY	RESCALATION RATE = 1.0%	11095.
OLR, INS, ETC.	INFLATION RATE = 0.08	17.
TOTAL SYSTEM		13953.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.107

ANNUAL OUTPUT 190000. TONS/yr
 LEVELIZED ENERGY COST (¢/TON) 73.44 59.60
 UNIT ENERGY COST (¢/TON) 73.44 59.60

UNDISCOUNTED PAYBACK PERIOD = 5.2 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 18.0 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW
 (COGEN. REIDS INCHOCGEN. - (THOUSANDS OF DOLLARS)) = 18907.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF FIRM	= 3.4	EFFECTIVE TAX RATE	= 50.8
COST OF COMMON EQUITY	= 7.8	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0.8	TAX LIFE	= 15. YRS
DEBT CAPITALIZATION	= 30.7	INVESTMENT TAX CREDIT	= 10.8
COMMON STOCK CAPITALIZ.	= 70.7	INSURANCE & OTHER CHARGES	= 3.8
PREFERRED STOCK CAPITALIZ.	= 0.6	INCREMENTAL CAPITAL INV.	= 0.8

AVERAGE ENERGY REQUIREMENTS

BARRELS PER BARREL

NO.19 SIC 2911 PETROLEUM REFINING

TIME FRAME : 1990.

STRATEGY : OPTIMUM

SELECTED TECHNOLOGY

= NO.15 ADVANCED TECHNOLOGY,GAS TURBINE,DIRECT FIRED,COAL(PFB)

SELECTED NON
TECHNOLOGY COGENERATION

FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	1973.32
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	936.06
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	2131.79	495.70
OTHER	0.0	603.07
TOT FUEL CONSUMPTION (10**12 BTU)		
SITE	2131.79	4000.15
SOURCE	2131.79	4000.15
IND BYPRODUCT FUEL (10**12 BTU)	0.0	0.0
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)	29.67	27.50
(10**12 BTU) FUEL ENERGY	1220.29	293.31
ELECTRICITY PURCHASED (10**9 KWH)	-226.05	27.50
(10**12 BTU) FUEL ENERGY	-2419.33	293.31
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	1956.36	0.0
SOURCE	1956.36	0.0
TOT OIL AND GAS SAVE (10**12 BTU)	2909.30	0.0
NATURAL GAS SAVINGS (10**12 BTU)	1973.32	0.0
(10**9 CU FT)	2121.31	0.0
OIL SAVINGS (10**12 BTU)	936.06	0.0
EQUIV. BBL'S	161.30	0.0
COAL SAVINGS (SOURCE) (10**12 BTU)	-1636.00	0.0
(10**6 TONS)	-75.90	0.0

FUEL ENERGY UTILIZATION RATIOS

FUEL ENERGY SAVING SOURCE	SELECTED TECHNOLOGY	NON COGENERATION
U/U(0)	0.301	0.0
ECS FUEL/U(0)	0.301	0.0
F/U(0)	-0.248	1.000
SPECIFIED FUEL/U(0)	12.436	0.0
ENERGY CONVERSION SYSTEM DATA DESIGN OPTION	3.080	12.938
	0.0	0.0
	2.0	0.0
ECS SIZE (MM)	84.20	0.0
NO. OF UNITS	4.0	0.0
ECS ELECTRICAL EFF-ETA	0.240	0.0
SENSIBLE WASTE HEAT RATIO--A	0.888	0.0
AVBL WASTE HEAT RATIO,R'--HG (NON ADDITIVE)	1.000	0.0
AVBL WASTE HEAT RATIO,R'--700	0.453	0.0
AVBL WASTE HEAT RATIO,R'--500	0.114	0.0
AVBL WASTE HEAT RATIO,R'--300	0.122	0.0
AVBL WASTE HEAT RATIO,R'--HW	0.074	0.0
TOTAL R	0.763	0.0
RECOV WASTE HEAT RATIO,R--HG	0.997	0.0
RECOV WASTE HEAT RATIO,R--700	0.0	0.0
RECOV WASTE HEAT RATIO,R--500	0.002	0.0
RECOV WASTE HEAT RATIO,R--300	0.000	0.0
RECOV WASTE HEAT RATIO,R--HW	0.000	0.0
TOTAL R	0.999	0.0
AUXILIARY POWER REQUIRED(KW)	5346.	2356.
AUX THERMAL REQ(10**6 BTU)	0.	35.
COP OF HEAT PUMP	0.0	0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT
(\$ 000)

COST CATEGORY	SELECTED TECHNOLOGY			NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE					
1.1 FUEL STORAGE AND RETRIEVAL	10010.	6211.	17022.	3453.	
1.2 LIMESTONE STORAGE AND RETRIEVAL	4047.	4014.	8061.	0.	
1.3 WASTE HANDLING SYSTEMS	1830.	250.	2080.	0.	
SUB-TOTAL	16687.	10475.	27162.	3453.	
2. ECS HEAT SOURCE					
2.1 HEAT SOURCE	6961.	42982.	112644.	0.	
2.2 SPECIAL EMISSIONS CONTROLS	24.	7.	32.	0.	
2.3 FEED WATER SYSTEMS	454.	191.	645.	736.	
2.4 GASIFIER(ECS)	0.	0.	0.	0.	
SUB-TOTAL	70140.	43181.	113321.	736.	
3. ENERGY CONVERSION SYSTEM(ECS)					
3.1 PRIMARY ENERGY CONVERTER	20024.	7040.	35064.	0.	
3.2 PRIMARY GENERATOR/INVERTER	10560.	0.	10560.	0.	
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.	
3.4 SECONDARY GENERATOR	0.	0.	0.	0.	
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.	
3.6 HEAT RECOVERY EQUIPMENT	17763.	5526.	23289.	0.	
3.7 CONDENSERS	0.	0.	0.	0.	
3.8 HEAT PUMP	0.	0.	0.	0.	
SUB-TOTAL	57147.	12566.	69713.	0.	
4. THERMAL STORAGE	0.	0.	0.	0.	
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	1964.	660.	2644.	3763.	
6. HEAT REJECTION	0.	0.	0.	0.	
7. OTHER BALANCE OF PLANT ITEMS					
7.1 SITE PREPARATION	0.	2129.	2129.	66.	
7.2 STRUCTURES	0.	0.	0.	539.	
7.3 ELECTRICAL CONDITIONING & CONTROL	27.	30.	65.	103.	
SUB-TOTAL	27.	2167.	2194.	720.	
8. INDIRECT COSTS					
8.1 CONTINGENCY	29193.	13014.	43007.	1736.	
8.2 ENGINEERING AND FEES	21895.	10360.	32255.	1302.	
SUB-TOTAL	51087.	24174.	75261.	3030.	
TOTAL CAPITAL COST ESTIMATE	197052.	93243.	290294.	11710.	
CONSTRUCTION TIME(YEARS)	0.	3.	3.	0.	
CAPITAL COST EXPENDITURE	213450.	101005.	314450.	11765.	

SELECTED NON
TECHNOLOGY COGENERATION

ANNUAL COSTS

OPERATING COSTS 1990. (K\$/YR)

NATURAL GAS	0.	0.
PETROLEUM DISTILLATE	0.	0.
PETROLEUM RESIDUAL	0.	0.
COAL GAS	0.	0.
COAL DERIVED DISTILLATE	0.	125301.
COAL DERIVED RESIDUAL	89555.	0.
COAL	0.	0.
OTHER	7581.	0.
LINESTONE/DOLOMITE	97137.	125301.
TOTAL FUEL COST		

ELECTRICITY
STAND-BY CHARGE
O & M COST

-49103.	992.
11466.	257.
59499.	135480.

TOTAL OPERATING COSTS

LEVELIZED OPERATING COSTS
LEVELIZED FIXED CHARGES
LEVELIZED ANNUAL COST
COST SAVINGS
COST SAVINGS RATIO

64475.	152113.
31760.	1180.
96236.	153301.
57065.	0.
0.372	0.0

ENVIRONMENTAL IMPACT

PLANT EMISSIONS(TON/YR)

26629.496	15840.701
6141.945	9612.125
93.954	384.485
488.735	1922.426
33354.129	27759.816

UTILITY EMISSIONS(TON/YR)

-15094.953	1830.057
-8805.391	1067.534
-1761.077	213.507
-1257.913	152.505
-26919.328	3263.602

TOTAL

6434.801	31023.410
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EMISSIONS SAVINGS RATIO

0.187	0.0
0.605	0.0
0.960	0.0
0.853	0.0

TOTAL

0.424	0.0
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SOLID WASTES

625861.625	0.0
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CASE 62 INDUSTRY: TITILLION REFINING STRATEGY-UP-TIMM (OWN: 50%-UTILITY
 CO. IS ADVANCED TECHNOLOGY, GAS TURNING DIRECT FIRED, CHAL (P+B)

START-UP DATE = 1960.

PAGE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-OF-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 3.5%

FIXED CHARGE RATE ON INVESTMENT CAPITAL = 7.9%

GENERAL INFLATION RATE = 0.0%

NONCOGEN COGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 11765. 31460.

LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 2861507. 1657221.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION

NATURAL GAS ESCALATION RATE = 3.6% 931. 24870.

WATER ESCALATION RATE = 1.0% 0. 0.

RESIDUAL ESCALATION RATE = 1.0% 143068. 0.

COAL ESCALATION RATE = 1.0% 0. 102254.

COAL GAS & OTHER ESCALATION RATE = 1.0% 0. 0.

ELECTRICITY ESCALATION RATE = 1.0% 11329. -56065.

DEM, INS, ETC. INFLATION RATE = 0.0% 257. 19057.

TOTAL SYSTEM 155584. 90106.

404-

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.421

ANNUAL OUTPUT 66916672 (BARRELS)

LEVELIZED ENERGY COST (15/BARREL)*

UNIT ENERGY COST (15/BARREL)**

UNDISCOUNTED PAYBACK PERIOD = 6.0 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 16.4%

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(COGEN. MINUS NONCOGEN. - (THOUSANDS OF DOLLARS)) = 591236.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING
 POWER AND GROWS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 2.%	EFFECTIVE TAX RATE	= 50.%
COST OF COMMON EQUITY	= 6.%	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0.%	TAX LIFE	= 30. YRS
DEBT CAPITALIZATION	= 50.%	INVESTMENT TAX CREDIT	= 10.%
COMMON STOCK CAPITALIZ.	= 50.%	INSURANCE & OTHER TAXES	= 2.%
PREFERRED STOCK CAPITALIZ.	= 0.%	INCREMENTAL CAPITAL INW.	= 0.%

ORIGINAL PAGE 15
 OF POOR QUALITY

AVERAGE ENERGY REQUIREMENTS

NO.22 SIC 3241 CEMENT - DRY

TONS) TON)

TIME FRAME = 1990.

STRATEGY : MATCH-E

SELECTED TECHNOLOGY

= NO.37 ADVANCED TECHNOLOGY, ORGANIC RANKINE, BOTTOMINGS

	SELECTED TECHNOLOGY	NON COGENERATION

FUEL UTILIZATION (10**12 BTU)		
NATURAL GAS	0.0	48.92
PETROLEUM DISTILLATE	0.0	0.0
PETROLEUM RESIDUAL	0.0	15.06
COAL GAS	0.0	0.0
COAL DERIVED DISTILLATE	0.0	0.0
COAL DERIVED RESIDUAL	0.0	0.0
COAL	0.0	235.81
OTHER	0.0	0.0
TOT FUEL CONSUMPTION(10**12 BTU)		
SITE	0.0	300.61
SOURCE	0.0	300.61
IND BYPRODUCT FUEL (10**12 BTU)	0.0	0.0
TOTAL ELECTRIC CONSUMPTION (10**9 KWH)	0.0	5.40
(10**12 BTU) FUEL ENERGY	0.0	57.62
ELECTRICITY PURCHASED (10**9 KWH)	0.0	5.40
(10**12 BTU) FUEL ENERGY	0.0	57.62
TOT FUEL ENERGY SAVE (10**12 BTU)		
SITE	0.0	0.0
SOURCE	0.0	0.0
TOT OIL AND GAS SAVE(10**12 BTU)	0.0	0.0
NATURAL GAS SAVINGS (10**12 BTU)	0.0	0.0
(10**9 CU FT)	0.0	0.0
OIL SAVINGS (10**12 BTU)	0.0	0.0
EQUIV. BBLs	0.0	0.0
COAL SAVINGS (SOURCE) (10**12 BTU)	0.0	0.0
(10**6 TONS)	0.0	0.0

SELECTED TECHNOLOGY NON COGENERATION

FUEL ENERGY UTILIZATION RATIOS
FUEL ENERGY SAVINGS RATIO

SITE SOURCE -1000.000 0.0
-1000.000 0.0

U/U(0) 0.0 1.000

ECS FUEL/U(0) 0.0 0.0

F/U(0) 0.0 4.217

SPECIFIED FUEL/U(0) 0.0 0.0

ENERGY CONVERSION SYSTEM DATA
DESIGN OPTION

0.0 0.0

ECS SIZE (MM)

0.0 0.0

NO. OF UNITS

0.0 0.0

ECS ELECTRICAL EFF-EAE

0.0 0.0

SENSIBLE WASTE HEAT RATIO--A

0.0 0.0

AVBL WASTE HEAT RATIO.R'---HG
(NON ADDITIVE)

0.0 0.0

AVBL WASTE HEAT RATIO.R'-700

0.0 0.0

AVBL WASTE HEAT RATIO.R'-500

0.0 0.0

AVBL WASTE HEAT RATIO.R'-300

0.0 0.0

AVBL WASTE HEAT RATIO.R'---HH

0.0 0.0

TOTAL R

0.0 0.0

RECOV WASTE HEAT RATIO.R'---HG

0.0 0.0

RECOV WASTE HEAT RATIO.R-700

0.0 0.0

RECOV WASTE HEAT RATIO.R-500

0.0 0.0

RECOV WASTE HEAT RATIO.R-300

0.0 0.0

RECOV WASTE HEAT RATIO.R'---HH

0.0 0.0

TOTAL R

0.0 0.0

AUXILIARY POWER REQUIRED(KW)

0. 56.

AUX THERMAL REQ(10**6 BTU)

0. 0.

COP OF HEAT PUMP

0.0 0.0

U = UTILITY FUEL U(0) = UTILITY FUEL (NON-COGENERATION) F = AUXILIARY FUEL (INCLUDES SPECIFIED FUEL)

CAPITAL COST ACCOUNTING FOR TYPICAL PLANT
(\$ 000)

COST CATEGORY	***** SELECTED TECHNOLOGY ***		NON-COGEN	
	EQUIPMENT	INSTALLATION	TOTAL	TOTAL
1. FUEL/WASTE HANDLING AND STORAGE				
1.1 FUEL STORAGE AND RETRIEVAL	0.	0.	0.	3543.
1.2 Limestone Storage and Retrieval	0.	0.	0.	0.
1.3 WASTE HANDLING SYSTEMS	0.	0.	0.	0.
SUB-TOTAL	0.	0.	0.	3543.
2. ECS HEAT SOURCE				
2.1 HEAT SOURCE	0.	0.	0.	0.
2.2 SPECIAL EMISSIONS CONTROLS	0.	0.	0.	0.
2.3 FEED WATER SYSTEMS	0.	0.	0.	0.
2.4 GASIFIER(ECS)	0.	0.	0.	0.
SUB-TOTAL	0.	0.	0.	0.
3. ENERGY CONVERSION SYSTEM(ECS)				
3.1 PRIMARY ENERGY CONVERTER	0.	0.	0.	0.
3.2 PRIMARY GENERATOR/INVERTER	0.	0.	0.	0.
3.3 SECONDARY ENERGY CONVERTER	0.	0.	0.	0.
3.4 SECONDARY GENERATOR	0.	0.	0.	0.
3.5 BOTTOMING CYCLE VAPOR GENERATOR	0.	0.	0.	0.
3.6 HEAT RECOVERY EQUIPMENT	0.	0.	0.	0.
3.7 CONDENSERS	0.	0.	0.	0.
3.8 HEAT PUMP	0.	0.	0.	0.
SUB-TOTAL	0.	0.	0.	0.
4. THERMAL STORAGE	0.	0.	0.	0.
5. SUPPLEMENTARY HEAT(FURNACE, BOILER)	0.	0.	0.	0.
6. HEAT REJECTION	0.	0.	0.	0.
7. OTHER BALANCE OF PLANT ITEMS				
7.1 SITE PREPARATION	0.	0.	0.	35.
7.2 STRUCTURES	0.	0.	0.	0.
7.3 ELECTRICAL CONDITIONING & CONTROL	0.	0.	0.	4.
SUB-TOTAL	0.	0.	0.	39.
8. INDIRECT COSTS				
8.1 CONTINGENCY	0.	0.	0.	716.
8.2 ENGINEERING AND FEES	0.	0.	0.	537.
SUB-TOTAL	0.	0.	0.	1254.
TOTAL CAPITAL COST ESTIMATE	0.	0.	0.	4836.
CONSTRUCTION TIME(YEARS)	0.	0.	0.	0.
CAPITAL COST EXPENDITURE	0.	0.	0.	4836.

ANNUAL COSTS		SELECTED TECHNOLOGY		NON COGENERATION

OPERATING COSTS 1990. (K\$/YR)				
NATURAL GAS	0.	0.	0.	0.
PETROLEUM DISTILLATE	0.	0.	0.	0.
PETROLEUM RESIDUAL	0.	0.	0.	0.
COAL GAS	0.	0.	0.	0.
COAL DERIVED DISTILLATE	0.	0.	0.	0.
COAL DERIVED RESIDUAL	0.	0.	0.	0.
COAL	0.	0.	0.	10790.
OTHER	0.	0.	0.	0.
LIMESTONE/DOLomite	0.	0.	0.	0.
TOTAL FUEL COST	0.	0.	0.	10790.
ELECTRICITY	0.	0.	0.	4389.
STAND-BY CHARGE	0.	0.	0.	0.
O & M COST	0.	0.	0.	0.
TOTAL OPERATING COSTS	0.	0.	0.	15179.
LEVELIZED OPERATING COSTS	0.	0.	0.	17046.
LEVELIZED FIXED CHARGES	0.	0.	0.	488.
LEVELIZED ANNUAL COST	0.	0.	0.	17535.
COST SAVINGS	0.	0.	0.	0.
COST SAVINGS RATIO	0.0	0.0	0.0	0.0
ENVIRONMENTAL IMPACT				

PLANT EMISSIONS(TON/YR)				
SULFUR DIOXIDE	0.0	0.0	0.0	3421.406
NITROGEN OXIDES	0.0	0.0	0.0	1995.021
HYDROCARBONS	0.0	0.0	0.0	399.164
PARTICULATES	0.0	0.0	0.0	285.117
SUBTOTAL	0.0	0.0	0.0	6101.508
UTILITY EMISSIONS(TON/YR)				
SULFUR DIOXIDE	0.0	0.0	0.0	809.520
NITROGEN OXIDES	0.0	0.0	0.0	472.220
HYDROCARBONS	0.0	0.0	0.0	94.444
PARTICULATES	0.0	0.0	0.0	67.460
SUBTOTAL	0.0	0.0	0.0	1443.644
TOTAL	0.0	0.0	0.0	7545.148
EMISSIONS SAVINGS RATIO				
SULFUR DIOXIDE	0.0	0.0	0.0	0.0
NITROGEN OXIDES	0.0	0.0	0.0	0.0
HYDROCARBONS	0.0	0.0	0.0	0.0
PARTICULATES	0.0	0.0	0.0	0.0
TOTAL	0.0	0.0	0.0	0.0
SOLID WASTES				
0.0 0.0 0.0 0.0				

CASE 120 INDUSTRIAL - MENT - DRY STRATEGY-UP-TIMING OWNED-SHIP--INDUSTRIAL
 101.37 ADVANCED TECHNOLOGY, ORGANIC MARKING, MOTIONING

START-UP DATE = 1990.
 BASE YEAR OF COST ESTIMATES = 1978.

DEPRECIATION-SUM-UP-THE-YEARS DIGITS METHOD

AFTER-TAX COST-OF-CAPITAL = 5.38
 FIXED CHARGE RATE ON INVESTMENT CAPITAL = 10.18
 GENERAL INFLATION RATE = 0.08

Power Systems Division

NONCOGEN COGEN

CAPITAL COST (THOUSANDS OF DOLLARS) 4836. 9231.

LIFE-CYCLE COST (THOUSANDS OF DOLLARS) 260156. 233285.

ANNUALIZED COSTS (THOUSANDS OF DOLLARS)

FIXED PORTION

NATURAL GAS	RESCALATION RATE = 3.68	486.	924.
DISTILLATE	RESCALATION RATE = 1.08	0.	0.
RESIDUAL	RESCALATION RATE = 1.08	0.	0.
COAL	RESCALATION RATE = 1.08	12169.	12169.
COAL GAS & OTHER	RESCALATION RATE = 1.08	0.	0.
ELECTRICITY	RESCALATION RATE = 1.08	4949.	2345.
DEW, INS, ETC.	INFLATION RATE = 0.08	0.	344.

TOTAL SYSTEM

17605. 19786.

LEVELIZED ANNUAL COST SAVINGS RATIO = 0.103

ANNUAL OUTPUT 1032333. (TONS)

LEVELIZED ENERGY COST (1/TON) * 17.04 15.20
 UNIT ENERGY COST (1/TON) ** 17.04 15.28

UNDISCOUNTED PAYBACK PERIOD = 3.3 YEARS

DISCOUNTED CASH FLOW RATE OF RETURN = 28.9 %

NET PRESENT VALUE OF INCREMENTAL CASH FLOW

(COGEN. MINUS NONCOGEN. - (THOUSANDS OF DOLLARS)) = 13222.

* BASED ON ANNUAL OUTPUT OF PRODUCT

** HAS AN UNCHANGING VALUE IN TERMS OF CONSTANT PURCHASING POWER AND GAINS ANNUALLY AT THE GENERAL INFLATION RATE

COST OF DEBT	= 3.4	EFFECTIVE TAX RATE	= 50.8
COST OF COMMON EQUITY	= 7.8	ECONOMIC LIFE	= 30. YRS
COST OF PREFERRED EQUITY	= 0.8	TAX LIFE	= 15. YRS
DEBT CAPITALIZATION	= 30.8	INVESTMENT TAX CREDIT	= 10.8
COMMON STOCK CAPITALIZ.	= 70.8	INSURANCE & OTHER TAXES	= 3.8
PREFERRED STOCK CAPITALIZ.	= 0.8	INCREMENTAL CAPITAL INV.	= 0.8

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TABLE VI-10
ENERGY CONSERVATION
SYSTEM CHARACTERISTICS

P3D 3/2/77

NO. 1 CURRENT TECHNOLOGY STEAM TURBINE GAS PSIA(EXT), P11, P.G.

Power Systems Division

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	300.00	300.00	300.00	300.00	300.00
MINIMUM POWER (MW)	0.00	0.00	0.00	0.00	0.00
NOMINAL POWER (MW)	10.00	10.00	10.00	10.00	10.00

ENERGY FRACTION - MINIMAL SIZE

ELECTRICITY	0.1720	0.1120	0.0710	0.0484	0.0400
HOT WATER	0.00	0.00	0.00	0.00	0.00
300 F STEAM	0.00	0.00	0.00	0.00	0.00
500 F STEAM	0.00	0.00	0.00	0.00	0.00
700 F STEAM	0.3330	0.5620	0.7230	0.8046	0.8280
IRRECOVERABLE LOSSES	0.0514	0.0486	0.0465	0.0454	0.0450
SENSIBLE HEAT	0.7765	0.9394	0.8825	0.9062	0.9150
DIRECT HEAT AVAILABLE	0.00	0.00	0.00	0.00	0.00
CLEARNESS INDICATOR	0.00	0.00	0.00	0.00	0.00
DIR. HEAT TEMPERATURE (F)	0.00	0.00	0.00	0.00	0.00

HEAT SOURCE NO. 1

HEAT REJECTION NO. 2	0.3460	0.1840	0.0660	0.0150	0.00
HEAT REJECTION FRACTION					

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	0.760
NOX OUTPUT	0.500
COX OUTPUT	0.020
PARTICULATE OUTPUT	0.016
SOLID WASTES	0.00

COST DATA AT 10.0MW (1/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.00	0.00
3.1 PRIMARY CONVERTER	110.40	6.92
3.2 PRIMARY CONDENSER	49.20	0.00
3.3 SECONDARY CONVERTER	0.00	0.00
3.4 SECONDARY CONDENSER	0.00	0.00
3.6 HEAT RECOVERY	0.00	0.00

0.0 M CHSIS (CENTS/KWH)

0.04

SPACE DATA AT 10.0MW

SPECIFIC AREA (FT2/KW)	0.05
SPECIFIC VOLUME (FT3/KW)	0.90
SPECIFIC WEIGHT (LBS/KW)	15.27

INSTALLATION TIME (YEARS)

1.

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NO. 1 CURRENT TECHNOLOGY, STEAM TURBINE, 65 PSIA (EXH), P&I, R. G.

	DESIGN OPTION			
	1	2	3	4
ENERGY CONVERSION SYSTEM				
MAXIMUM POWER (MW)	300.00	300.00	300.00	300.00
MINIMUM POWER (MW)	0.40	0.40	0.40	0.40
NOMINAL POWER (MW)	10.00	10.00	10.00	10.00
ENERGY FRACTION - MINIMAL SIZE				
ELECTRICITY	0.2470	0.2220	0.1920	0.1606
NET WATER	0.0	0.0	0.0	0.0
300 F STEAM	0.1150	0.2624	0.4540	0.6050
500 F STEAM	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0553	0.0531	0.0324	0.0514
SENSIBLE HEAT	0.4977	0.7239	0.7554	0.7000
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 5.				
HEAT REJECTION NO. = 2.				
HEAT REJECTION FRACTION	0.4970	0.3780	0.2200	0.0910

EMISSIONS (DETAILS/MILLION BTU)	
SO2 OUTPUT	0.760
NOX OUTPUT	0.500
CO2 OUTPUT	0.020
PARTICULATE OUTPUT	0.016
SURIN WASTES	0.0

COST DATA AT 10.0MW (\$/KW)	
EQUIPMENT	0.0
INSTALLATION	0.0
2.4 GYSIFER	0.0
3.1 PRIMARY CONVERTER	111.40
3.2 PRIMARY GENERATOR	44.70
3.3 SECONDARY CONVERTER	0.0
3.4 SECONDARY GENERATOR	0.0
3.6 HEAT RECOVERY	0.0

O & M COSTS (CENTS/KWH)	0.00
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SPACE DATA AT 10.0MW	
SPECIFIC AREA (FT ² /KW)	0.05
SPECIFIC VOLUME (FT ³ /KW)	0.00
SPECIFIC WEIGHT (LBS/KW)	15.27

INSTALLATION TIME (YEARS)	1.
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Power Systems Division

NO. 2 CURRENT TECHNOLOGY STEAM TURBINE-AIS ESTIMATE-CMIL

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 300.00 300.00 300.00 300.00 300.00
MINIMUM POWER (MW) 0.00 0.00 0.00 0.00 0.00
MINIMAL POWER (MW) 10.00 10.00 10.00 10.00 10.00

ENERGY FRACTION - MINIMAL SIZE

ELECTRICITY 0.1674 0.1060 0.0410 0.0454 0.0322
HOT WATER 0.00 0.00 0.00 0.00 0.00
300 F STEAM 0.00 0.00 0.00 0.00 0.00
500 F STEAM 0.00 0.00 0.00 0.00 0.00
700 F STEAM 0.3240 0.5404 0.7020 0.7774 0.8170
IRRECOVERABLE LOSSES 0.0074 0.0703 0.0700 0.0753 0.0746
SENSIBLE HEAT 0.7210 0.8157 0.8630 0.8793 0.8932
DIRECT HEAT AVAILABLE 0.00 0.00 0.00 0.00 0.00
CLEANLINESS INDICATOR 0.00 0.00 0.00 0.00 0.00
DIR. HEAT TEMPERATURE (F) 0.00 0.00 0.00 0.00 0.00

HEAT SOURCE NO. = 10.

HEAT REJECTION NO. = 2.

HEAT REJECTION FRACTION 0.3400 0.1050 0.0720 0.0150 0.00

413

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT 1-200
NOX OUTPUT 0.700
CO OUTPUT 0.014
PARTICULATE OUTPUT 0.100
SOLID WASTES 0.760

COST DATA AT 10.0MW (1974) EQUIPMENT INSTALLATION

2.4 CONDENSER 0.00 0.00
3.1 PRIMARY CONVERTER 118.40 6.92
3.2 PRIMARY GENERATOR 49.20 0.00
3.3 SECONDARY CONVERTER 0.00 0.00
3.4 SECONDARY GENERATOR 0.00 0.00
3.6 HEAT RECOVERY 0.00 0.00

O & M COSTS (CENTS/KWH) 0.06

SPACE DATA AT 10.0MW

SPECIFIC AREA (FT2/KW) 0.05
SPECIFIC VOLUME (FT3/KW) 0.90
SPECIFIC WEIGHT (LBS/KW) 15.27

INSTALLATION TIME (YEARS) 1.

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NO. 2 CURRENT TECHNOLOGY, STEAM BURNING, 65 PSIA (EXT), CIAL

Power Systems Division

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DESIGN OPTION

1

2

3

4

5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW)	300.00	300.00	300.00	300.00	300.00
MINIMUM POWER (MW)	0.60	0.60	0.60	0.60	0.60
NOMINAL POWER (MW)	18.00	18.00	18.00	18.00	18.00

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY	0.2370	0.2120	0.1820	0.1614	0.1470
HOT WATER	0.0	0.0	0.0	0.0	0.0
300 F STEAM	0.1150	0.2500	0.4390	0.5796	0.6658
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0844	0.0836	0.0821	0.0811	0.0803
SENSIBLE HEAT	0.6782	0.7044	0.7359	0.7575	0.7727
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DUR, HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0

HEAT SOURCE NO.=10.

HEAT REJECTION NO.=2.

HEAT REJECTION FRACTION

0.4780	0.3690	0.2150	0.0970	0.0260
--------	--------	--------	--------	--------

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	1.200
NOX OUTPUT	0.700
CHX OUTPUT	0.014
PARTICULATE OUTPUT	0.100
SOLID WASTES	6.760

COST DATA AT 18.0MW (S/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	111.00	6.92
3.2 PRIMARY GENERATOR	46.20	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0
3.6 HEAT RECOVERY	0.0	0.0

O & M COSTS (CENTS/KWH) 0.06

SPACE DATA AT 18.0MW

SPECIFIC AREA (F12/KW)	0.05
SPECIFIC VOLUME (F13/KW)	0.90
SPECIFIC WEIGHT (LBS/KW)	15.27

INSTALLATION TIME (YEARS)

1.

Power Systems Division

NO. 3 CURRENT TECHNOLOGY, DIESEL, HIGH SPEED, PETROLEUM DIST.

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 0.41 1.60 0.0 0.0 0.0
MINIMUM POWER (MW) 0.29 0.41 0.0 0.0 0.0
MINIMAL POWER (MW) 0.35 0.62 0.0 0.0 0.0

ENERGY FRACTION - MINIMAL SIZE

ELECTRICITY 0.3300 0.3500 0.0 0.0 0.0
HOT WATER 0.2150 0.2450 0.0 0.0 0.0
300 F STEAM 0.0 0.0 0.0 0.0 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.1550 0.1900 0.0 0.0 0.0
IRRECOVERABLE LOSSES 0.0789 0.0799 0.0 0.0 0.0
SENSIBLE HEAT 0.5911 0.5701 0.0 0.0 0.0
DIRECT HEAT AVAILABLE 0.3763 0.3261 0.0 0.0 0.0
CLEANLINESS INDICATOR 2.0 2.0 0.0 0.0 0.0
DIR. HEAT TEMPERATURE (F) 1000.0 900.0 0.0 0.0 0.0

HEAT SOURCE NO. = 0.

HEAT REJECTION NO. = 3.

HEAT REJECTION FRACTION 0.0 0.0 0.0 0.0 0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT 0.516
NOX OUTPUT 4.000
CHX OUTPUT 0.040
PARTICULATE OUTPUT 0.020
SOLID WASTES 0.0

COST DATA AT 0.6MW (S/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0 0.0
3.1 PRIMARY CONVERTER 121.00 93.00
3.2 PRIMARY GENERATOR 24.00 0.0
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0
3.6 HEAT RECOVERY 18.00 0.0

O & M COSTS (CENTS/KWH) 0.70

SPACE DATA AT 0.6MW

SPECIFIC AREA (F12/KW) 1.50
SPECIFIC VOLUME (F13/KW) 18.00
SPECIFIC WEIGHT (LBS/KW) 20.00

INSTALLATION TIME (YEARS) 1.

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Power Systems Division

NO. 4 CURRENT TECHNOLOGY, DIESEL, LOW SPEED, PETROLEUM BOILER GRADE

	DESIGN OPTION				
	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	28.56	0.0	0.0	0.0	0.0
MINIMUM POWER (MW)	8.11	0.0	0.0	0.0	0.0
NOMINAL POWER (MW)	8.34	0.0	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.3650	0.0	0.0	0.0	0.0
HOT WATER	0.2100	0.0	0.0	0.0	0.0
300 F STEAM	0.1600	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRADIABLE LOSSES	0.0614	0.0	0.0	0.0	0.0
SENSIBLE HEAT	0.5738	0.0	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.3575	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	3.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	540.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 2.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

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EMISSIONS DATA (LBS/MILLION BTU)	
SO2 OUTPUT	0.757
NOX OUTPUT	3.680
COX OUTPUT	0.170
PARTICULATE OUTPUT	0.012
SOLID WASTES	0.0

COST DATA AT 18.3MW (S/KW)	
2.4 GASIFIER	0.0
3.1 PRIMARY CONVERTER	376.66
3.2 PRIMARY GENERATOR	85.00
3.3 SECONDARY CONVERTER	0.0
3.4 SECONDARY GENERATOR	0.0
3.6 HEAT RECOVERY	36.67
EQUIPMENT INSTALLATION	0.0

O & M COSTS (CENTS/KWH)	0.14
-------------------------	------

SPACE DATA AT 18.3MW	
SPECIFIC AREA (FT2/KW)	0.40
SPECIFIC VOLUME (FT3/KW)	25.00
SPECIFIC WEIGHT (LBS/KW)	100.00

INSTALLATION TIME (YEARS)	1.
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NO. 5 CURRENT TECHNOLOGY, GAS TURBINE, DIRECT FIRED, PETROL FIRM DIST

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM PUMP (MM)	100.00	100.00	100.00	100.00	0.0
MINIMUM PUMP (MM)	1.00	1.00	1.00	1.00	0.0
NOMINAL PUMP (MM)	30.00	30.00	30.00	30.00	0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY	0.2850	0.2950	0.3050	0.3100	0.0
HOT WATER	0.0300	0.0500	0.0500	0.0	0.0
300 F STEAM	0.0	0.0	0.0200	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.4850	0.4450	0.4100	0.7050	0.0
IRRECOVERABLE LOSSES	0.0766	0.0771	0.0776	0.0694	0.0
SENSIBLE HEAT	0.6384	0.6279	0.6174	0.7906	0.0
DIRECT HEAT AVAILABLE	0.6384	0.6279	0.6174	0.7906	0.0
CLEANLINESS INDICATOR	2.0	2.0	2.0	2.0	0.0
DIR. HEAT TEMPERATURE (F)	1022.0	963.0	906.0	906.0	0.0

HEAT SOURCE NO. = 0.

HEAT REJECTION NO. = 0.

HEAT REJECTION FRACTION 0.0 0.0 0.0 0.0 0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO ₂ OUTPUT	0.520
NO _x OUTPUT	0.400
CH ₄ OUTPUT	0.020
PARTICULATE OUTPUT	0.0
SOLID WASTES	0.0

COST DATA AT 30.0MW (\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	64.00	24.00
3.2 PRIMARY GENERATOR	36.00	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0

3.6 HEAT RECOVERY (\$/MBTU * 1)	5100.00	1800.00
• AT 100 MBTU/HR		

O & M COSTS (CENTS/KWH)

0.25

SPACE DATA AT 30.0MW

SPECIFIC AREA (FT ² /KW)	0.05
SPECIFIC VOLUME (FT ³ /KW)	1.57
SPECIFIC WEIGHT (LBS/KW)	15.00

INSTALLATION TIME (YEARS)

1.

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Power Systems Division

NO. 6 CURRENT TECHNOLOGY, COMP. CYCLE, DIR. FIRED, PETROLEUM DIST.

	DESIGN OPTION				
	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	150.00	0.0	0.0	0.0	0.0
MINIMUM POWER (MW)	10.00	0.0	0.0	0.0	0.0
NOMINAL POWER (MW)	10.00	0.0	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.3700	0.0	0.0	0.0	0.0
HOT WATER	0.0200	0.0	0.0	0.0	0.0
300 F STEAM	0.0070	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.1580	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0800	0.0	0.0	0.0	0.0
SENSIBLE HEAT	0.5491	0.0	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.3492	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	2.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (E)	908.0	0.0	0.0	0.0	0.0

HEAT SOURCE NO. = 0.	
HEAT REJECTION NO. = 2.	
HEAT REJECTION FRACTION	0.2000 0.0 0.0 0.0 0.0 0.0

EMISSIONS DATA (LBS/MILLION BTU)	
SO2 OUTPUT	0.520
NOX OUTPUT	0.400
COX OUTPUT	0.020
PARTICULATE OUTPUT	0.0
SOLID WASTES	0.0

COST DATA AT 30.0MW (S/KW)	
EQUIPMENT	INSTALLATION
2.4 GASIFIER	0.0
3.1 PRIMARY CONVERTER	54.00
3.2 PRIMARY GENERATOR	31.00
3.3 SECONDARY CONVERTER	35.00
3.4 SECONDARY GENERATOR	9.00
3.6 HEAT RECOVERY	22.00
	8.00

O & M COSTS (CENTS/KWH)	0.20
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SPACE DATA AT 30.0MW	
SPECIFIC AREA (FT2/KW)	0.20
SPECIFIC VOLUME (FT3/KW)	12.5H
SPECIFIC HEIGHT (LBS/KW)	40.00

INSTALLATION TIME (YEARS)	2.
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FCR-1333

Power Systems Division

NO. 7 ADVANCED TECHNOLOGY STEAM TURBINE-615 PSIA(EXT)-COAL (ER. U.G.)

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	300.00	300.00	300.00	300.00	300.00
MINIMUM POWER (MW)	0.60	0.60	0.60	0.60	0.60
NOMINAL POWER (MW)	18.00	18.00	18.00	18.00	18.00
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.1956	0.1576	0.1060	0.0800	0.0656
HOT WATER	0.00	0.00	0.00	0.00	0.00
300 F STEAM	0.00	0.00	0.00	0.00	0.00
500 F STEAM	0.00	0.00	0.00	0.00	0.00
700 F STEAM	0.2354	0.4730	0.6550	0.7640	0.8088
IRRECOVERABLE LOSSES	0.0444	0.0429	0.0403	0.0390	0.0383
SENSIBLE HEAT	0.7596	0.7995	0.8337	0.8810	0.8961
DIRECT HEAT AVAILABLE	0.00	0.00	0.00	0.00	0.00
CLEANLINESS INDICATOR	0.00	0.00	0.00	0.00	0.00
DIN. HEAT TEMPERATURE(F)	0.00	0.00	0.00	0.00	0.00

HEAT SOURCE NO. = 6.	
HEAT REJECTION NO. = 2.	
HEAT REJECTION FRACTION	0.4400 0.2440 0.1150 0.0330 0.00

EMISSIONS DATA(LBS/MILLION BTU)

SO2 OUTPUT	0.824
NOX OUTPUT	0.500
CHX OUTPUT	0.020
PARTICULATE OUTPUT	0.100
SOLID WASTES	0.053

COST DATA AT 18.0MW (\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.00
3.1 PRIMARY CONVERTER	122.60
3.2 PRIMARY GENERATOR	52.60
3.3 SECONDARY CONVERTER	0.00
3.4 SECONDARY GENERATOR	0.00
3.6 HEAT RECOVERY	0.00

U & M COSTS (CENTS/KWH) 0.06

SPACE DATA AT 18.0MW	
SPECIFIC AREA (F12/KW)	0.05
SPECIFIC VOLUME (F13/KW)	0.96
SPECIFIC WEIGHT (LBS/KW)	15.21

INSTALLATION TIME (YEARS) 1.

FCR-1338

NO. 7 ADVANCED TECHNOLOGY STEAM TURBINE 65 PSIA(EXT) COAL DER. A.G.

	DESIGN OPTION				
	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	300.00	300.00	300.00	300.00	300.00
MINIMUM POWER (MW)	0.60	0.60	0.60	0.60	0.60
NOMINAL POWER (MW)	18.00	18.00	18.00	18.00	18.00
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2620	0.2520	0.2120	0.1888	0.1720
HOT WATER	0.0	0.0	0.0	0.0	0.0
300 F STEAM	0.1100	0.2480	0.4396	0.5826	0.6730
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0481	0.0471	0.0456	0.0444	0.0436
SENSIBLE HEAT	0.6899	0.7109	0.7424	0.7668	0.7844
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE(E)	0.2	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 6.					
HEAT REJECTION NO. = 2					
HEAT REJECTION FRACTION	0.4910	0.3750	0.2160	0.0980	0.0310
EMISSIONS (TAILS/MILLION BTU)					
SO ₂ OUTPUT	0.824				
NO _x OUTPUT	0.500				
CH ₄ OUTPUT	0.020				
PARTICULATE OUTPUT	0.100				
SOLID WASTES	0.053				
COST DATA AT 18.0MW (%/KW) EQUIPMENT INSTALLATION					
2-6 GASIFIER	0.0		0.0		
3-1 PRIMARY CONVERTER	110.90		6.92		
3-2 PRIMARY GENERATOR	51.10		0.0		
3-3 SECONDARY CONVERTER	0.0		0.0		
3-4 SECONDARY GENERATOR	0.0		0.0		
3-6 HEAT RECOVERY	0.0		0.0		
OLEN COSTS (CENTS/KWH) 0.06					
SPACE DATA AT 18.0MW					
SPECIFIC AREA (FT ² /KW)				0.05	
SPECIFIC VOLUME (FT ³ /KW)				0.90	
SPECIFIC WEIGHT (LBS/KW)				15.27	
INSTALLATION TIME (YEARS) 1.					

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NO. 4 ADVANCED TECHNOLOGY STEAM TURBINE, 615 PSIA(EXT), COAL (AFB)

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 300.00 300.00 300.00 300.00 300.00
MINIMUM POWER (MW) 0.60 0.60 0.60 0.60 0.60
NOMINAL POWER (MW) 18.00 18.00 18.00 18.00 18.00

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY 0.1860 0.1478 0.0992 0.0732 0.0594
HOT WATER 0.0 0.0 0.0 0.0 0.0
300 F STEAM 0.0 0.0 0.0 0.0 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.2200 0.4480 0.6228 0.7288 0.7730
IRRECOVERABLE LOSSES 0.0823 0.0804 0.0780 0.0767 0.0760
SENSIBLE HEAT 0.7317 0.7718 0.8228 0.8501 0.8646
DIRECT HEAT AVAILABLE 0.0 0.0 0.0 0.0 0.0
CLEANLINESS INDICATOR 0.0 0.0 0.0 0.0 0.0
DIR. HEAT TEMPERATURE (F) 0.0 0.0 0.0 0.0 0.0

HEAT SOURCE NO. = 11.

HEAT REJECTION NO. = 2.

HEAT REJECTION FRACTION 0.4200 0.2300 0.1050 0.0300 0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO₂ OUTPUT 1.200
NO_x OUTPUT 0.200
CO₂ OUTPUT 0.0
PARTICULATE OUTPUT 0.100
SOLID WASTES 36,000

COST DATA AT 18.0MW (6/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0 0.0
3.1 PRIMARY CONVERTER 122.60 6.92
3.2 PRIMARY GENERATOR 52.60 0.0
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0
3.6 HEAT RECOVERY 0.0 0.0

O & M COSTS (CENTS/KWH) 0.06

SPACE DATA AT 18.0MW

SPECIFIC AREA (FT²/KW) 0.05
SPECIFIC VOLUME (FT³/KW) 0.90
SPECIFIC WEIGHT (LBS/KW) 15.27

INSTALLATION TIME (YEARS) 1.

NO. 8 ADVANCED TECHNOLOGY STEAM TURBINE 65 PSI (AERT) COAL (AFB)

Power Systems Division

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	300.00	300.00	300.00	300.00	300.00
MINIMUM POWER (MW)	0.60	0.60	0.60	0.60	0.60
NOMINAL POWER (MW)	18.00	18.00	18.00	18.00	18.00
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2640	0.2384	0.2102	0.1834	0.1614
HOT WATER	0.00	0.00	0.00	0.00	0.00
300 F STEAM	0.1080	0.2440	0.4306	0.5742	0.6370
500 F STEAM	0.00	0.00	0.00	0.00	0.00
700 F STEAM	0.00	0.00	0.00	0.00	0.00
IRRECOVERABLE LOSSES	0.0862	0.0849	0.0835	0.0822	0.0811
SENSIBLE HEAT	0.8499	0.6767	0.7063	0.7344	0.7575
DIRECT HEAT AVAILABLE	0.00	0.00	0.00	0.00	0.00
CLEANLINESS INDICATOR	0.00	0.00	0.00	0.00	0.00
DIR. HEAT TEMPERATURE (F)	0.00	0.00	0.00	0.00	0.00
HEAT SOURCE NO. = 11.					
HEAT REJECTION NO. = 2.					
HEAT REJECTION FRACTION	0.4300	0.3270	0.1690	0.0500	0.0310

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EMISSIONS (TAILS/MILLION BTU)	
SO ₂ OUTPUT	1.200
NO _x OUTPUT	0.200
CH ₄ OUTPUT	0.00
PARTICULATE OUTPUT	0.100
SOLID WASTES	36.000

COST DATA AT 18.0MW (\$/KW) EQUIPMENT INSTALLATION	
2.4 GASIFIER	0.00
3.1 PRIMARY CONVERTER	118.40
3.2 PRIMARY GENERATOR	51.30
3.3 SECONDARY CONVERTER	0.00
3.4 SECONDARY GENERATOR	0.00
3.6 HEAT RECOVERY	0.00

O & M COSTS (CENTS/KWH)	0.06
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SPACE DATA AT 18.0MW	
SPECIFIC AREA (F ² /KW)	0.05
SPECIFIC VOLUME (F ³ /KW)	0.90
SPECIFIC WEIGHT (LBS/KW)	15.27

INSTALLATION TIME (YEARS)	1.
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Power Systems Division

NO. 9 ADVANCED TECHNOLOGY DIESEL WHEEL SPEED, CNAL DER. DIST.

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	15.00	0.0	0.0	0.0	0.0
MINIMUM POWER (MW)	0.00	0.0	0.0	0.0	0.0
NOMINAL POWER (MW)	2.00	0.0	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.1500	0.0	0.0	0.0	0.0
HOT WATER	0.0	0.0	0.0	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.3300	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0733	0.0	0.0	0.0	0.0
SENSIBLE HEAT	0.4767	0.0	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.4767	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	2.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	1050.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 3.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	0.565
NOX OUTPUT	2.000
CH4 OUTPUT	0.040
PARTICULATE OUTPUT	0.020
SOLID WASTES	0.0

COST DATA AT 2.0MW (S/KM) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	129.00	85.00
3.2 PRIMARY GENERATOR	24.00	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0
3.6 HEAT RECOVERY	22.00	0.0

O & M COSTS (CENTS/KWH) 0.70

SPACE DATA AT 2.0MW

SPECIFIC AREA (F2/KM)	1.50
SPECIFIC VOLUME (F3/FM)	10.00
SPECIFIC WEIGHT (LBS/KM)	20.00

INSTALLATION TIME (YEARS) 1.

FCR-1333

Power Systems Division

NO. 10 ADVANCED TECHNOLOGY DIESEL-LOW SPEED-COAL DERIVED BOILER GRD

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	20.60	20.20	0.0	0.0	0.0
MINIMUM POWER (MW)	8.21	8.21	0.0	0.0	0.0
MINIMAL POWER (MW)	20.00	20.00	0.0	0.0	0.0
ENERGY FRACTION - MINIMAL SIZE					
ELECTRICITY	0.3800	0.3800	0.0	0.0	0.0
HOT WATER	0.1400	0.2200	0.0	0.0	0.0
300 F STEAM	0.1800	0.0950	0.0	0.0	0.0
500 F STEAM	0.0500	0.0250	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0541	0.0343	0.0	0.0	0.0
SENSIBLE HEAT	0.9657	0.9657	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.4257	0.3656	0.0	0.0	0.0
CLEANLINESS INDICATOR	3.0	3.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	550.0	550.0	0.0	0.0	0.0
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 3,					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

EMISSIONS DATA (LBS/MILLION BTU)					
SO2 OUTPUT	0.824				
NOX OUTPUT	3.680				
CHX OUTPUT	0.170				
PARTICULATE OUTPUT	0.012				
SOLID WASTES	0.0				

COST DATA AT 20.04W (16/KW) EQUIPMENT INSTALLATION					
2.4 GASIFIER	0.0	0.0			
3.1 PRIMARY CONVERTER	370.00	0.00			
3.2 PRIMARY GENERATOR	85.00	0.0			
3.3 SECONDARY CONVERTER	0.0	0.0			
3.4 SECONDARY GENERATOR	0.0	0.0			
3.6 HEAT RECOVERY	67.00	0.0			

O & M COSTS (CENTS/KWH)	0.15				
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SPACE DATA AT 20.04W					
SPECIFIC AREA (FT2/KW)	0.40				
SPECIFIC VOLUME (FT3/KW)	25.00				
SPECIFIC WEIGHT (LBS/KW)	100.00				

INSTALLATION TIME (YEARS)	1.				
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FCR-1333

Power Systems Division

NO. 11 AIRMAILED TECHNOLOGY, DIESEL-LOW SPEED, CUMULATIVE (PULVERIZED)

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	28.60	0.0	0.0	0.0	0.0
MINIMUM POWER (MW)	0.01	0.0	0.0	0.0	0.0
MINIMAL POWER (MW)	20.97	0.0	0.0	0.0	0.0
ENERGY FRACTION - MINIMAL SIZE					
ELECTRICITY	0.3700	0.0	0.0	0.0	0.0
HEAT WATER	0.2200	0.0	0.0	0.0	0.0
300 F STEAM	0.0900	0.0	0.0	0.0	0.0
500 F STEAM	0.0600	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0915	0.0	0.0	0.0	0.0
SENSIBLE HEAT	0.5385	0.0	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.3185	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	3.0	0.0	0.0	0.0	0.0
DIRECT HEAT TEMPERATURE (F)	550.0	0.0	0.0	0.0	0.0

HEAT SOURCE NO. = 0.

HEAT REJECTION NO. = 3.

HEAT REJECTION FRACTION

0.0

0.0

0.0

0.0

0.0

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EMISSIONS (TONS/MILLION BTU)

SO₂ OUTPUT 1.200NO_x OUTPUT 3.500CH₄ OUTPUT 0.0

PARTICULATE OUTPUT 0.100

SOLID WASTES 0.0

COST DATA AT 20.0MW (S/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0

3.1 PRIMARY CONVERTER 369.92

3.2 PRIMARY GENERATOR 85.00

3.3 SECONDARY CONVERTER 0.0

3.4 SECONDARY GENERATOR 0.0

3.6 HEAT RECOVERY 66.99

0.0

O & M COSTS (CENTS/KWH) 0.15

SPACE DATA AT 20.0MW

SPECIFIC AREA (FT²/KW) 0.40SPECIFIC VOLUME (FT³/KW) 25.00

SPECIFIC WEIGHT (LBS/KW) 100.00

INSTALLATION TIME (YEARS) 2.

FCR-1333

Power Systems Division

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	100.00	100.00	100.00
MINIMUM POWER (MW)	1.00	1.00	1.00	5.00	5.00
NOMINAL POWER (MW)	30.00	30.00	30.00	30.00	30.00
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.3150	0.3200	0.3100	0.1450	0.2100
HOT WATER	0.0	0.0	0.0040	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.5050	0.5000	0.4000	0.7240	0.6300
IRRECOVERABLE LOSSES	0.0588	0.0590	0.0595	0.0502	0.0535
SENSIBLE HEAT	0.6262	0.6210	0.6105	0.8048	0.7365
DIRECT HEAT AVAILABLE	0.6262	0.6210	0.6105	0.8048	0.7365
CLEANLINESS INDICATOR	2.0	2.0	2.0	2.0	2.0
DIR. HEAT TEMPERATURE(F)	1193.0	1148.0	1109.0	1109.0	1109.0

HEAT SOURCE NO. = 0.	
HEAT REJECTION NO. = 0.	
HEAT REJECTION FRACTION	0.0 0.0 0.0 0.0 0.0

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EMISSIONS DATA(LOS/MILLION BTU)	
SO2 OUTPUT	0.760
NOX OUTPUT	0.500
PMX OUTPUT	0.020
PARTICULATE OUTPUT	0.030
SOLID WASTES	0.0

COST DATA AT 30.0MW (\$/KW) EQUIPMENT INSTALLATION	
2.4 GASIFIER	0.0
3.1 PRIMARY CONVERTER	24.00
3.2 PRIMARY GENERATOR	36.00
3.3 SECONDARY CONVERTER	0.0
3.4 SECONDARY GENERATOR	0.0
3.6 HEAT RECOVERY (B/MOTU *)	5100.00
0 AT 100 MW/MW	1800.00

O & M COSTS (CENTS/KWH)	0.20
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SPACE DATA AT 30.0MW	
SPECIFIC AREA (FT2/KW)	0.03
SPECIFIC VOLUME (FT3/KW)	2.05
SPECIFIC WEIGHT (LBS/KW)	10.00

INSTALLATION TIME (YEARS)	1.
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FCR-1333

Power Systems Division

NO. 13 ADVANCED TECHNOLOGY GAS TURBINE DIRECT FIRED-CUMUL PER-BLR GAS

	1	2	3	4	5
DESIGN INPUTS					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	100.00	100.00	100.00
MINIMUM POWER (MW)	1.00	1.00	1.00	5.00	5.00
NOMINAL POWER (MW)	30.00	30.00	30.00	30.00	30.00
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.3150	0.3200	0.3300	0.1470	0.2100
HEAT WITH	0.0	0.0	0.0050	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.5050	0.5000	0.4800	0.7200	0.6300
IRRECOVERABLE LOSSES	0.0500	0.0510	0.0515	0.0422	0.0455
SENSIBLE HEAT	0.6342	0.6290	0.6105	0.9120	0.7445
DIRECT HEAT AVAILABLE	0.6342	0.6290	0.6105	0.9120	0.7445
CLEANLINESS INDICATOR	2.0	2.0	2.0	2.0	2.0
DIG. HEAT TEMPERATURE (F)	1193.0	1159.0	1109.0	1109.0	1109.0
HEAT SOURCE MW = 0.					
HEAT REJECTION MW = 0.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	0.020
NITR OUTPUT	0.500
CH4 OUTPUT	0.020
PARTICULATE OUTPUT	0.100
SOLID WASTES	0.0

COST DATA AT 30.0MW (S/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0
3.1 PRIMARY CONVERTER	56.00
3.2 PRIMARY GENERATOR	36.00
3.3 SECONDARY CONVERTER	0.0
3.4 SECONDARY GENERATOR	0.0

3.6 HEAT RECOVERY (S/MW) * 1 5100.00 1800.00
0 AT 100 MW/MW

0.6 N CUSIS (LBS/KW) 0.2P

SPACE DATA AT 30.0MW

SPECIFIC AREA (FT2/KW)	0.01
SPECIFIC VOLUME (FT3/KW)	1.04
SPECIFIC WEIGHT (LBS/KW)	10.00

INSTALLATION TIME (YEARS) 1.

FCR-1333

NO.14 ADVANCED TECHNOLOGY GAS TURBINE, DIRECT FIRED, COAL GASIFIER

Power Systems Division

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 100.00 100.00 0.0 0.0 0.0
MINIMUM POWER (MW) 5.00 5.00 0.0 0.0 0.0
NOMINAL POWER (MW) 30.00 30.00 0.0 0.0 0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY 0.1800 0.1900 0.0 0.0 0.0
HOT WATER 0.0 0.0 0.0 0.0 0.0
300 F STEAM 0.0 0.0 0.0 0.0 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.6050 0.5950 0.0 0.0 0.0
IRRECOVERABLE LOSSES 0.1310 0.1315 0.0 0.0 0.0
SENSIBLE HEAT 0.6890 0.6785 0.0 0.0 0.0
DIRECT HEAT AVAILABLE 0.6890 0.6785 0.0 0.0 0.0
CLEANLINESS INDICATOR 1.0 1.0 0.0 0.0 0.0
DIR. HEAT TEMPERATURE (F) 1135.0 1109.0 0.0 0.0 0.0

HEAT SOURCE NO. = 0.

HEAT REJECTION NO. = 0.

HEAT REJECTION FRACTION 0.0 0.0 0.0 0.0 0.0

428

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT 0.020
NOX OUTPUT 0.500
COX OUTPUT 0.020
PARTICULATE OUTPUT 0.0
SOLID WASTES 0.0

COST DATA AT 30.0MW (1\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 515.00 115.00
3.1 PRIMARY CONVERTER 54.00 24.00
3.2 PRIMARY GENERATOR 36.00 0.0
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0

3.6 HEAT RECOVERY (1\$/MBTU @ 100 MBTU/HR) 5100.00 1800.00

0.6 M CISTS (CENTS/KWH) 0.30

SPACE DATA AT 30.0MW

SPECIFIC AREA (FT2/KW) 0.0
SPECIFIC VOLUME (FT3/KW) 1.05
SPECIFIC WEIGHT (LBS/KW) 10.00

INSTALLATION TIME (YEARS) 3.

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Power Systems Division

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NO.15 ADVANCED TECHNOLOGY GAS TURBINE-DIRECT FIRED COAL (PFB)

	DESIGN OPTION				
	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	100.00	100.00	0.0
MINIMUM POWER (MW)	5.00	5.00	5.00	10.00	0.0
NOMINAL POWER (MW)	30.00	30.00	30.00	30.00	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2200	0.2400	0.2600	0.1950	0.0
HOT WATER	0.0350	0.0500	0.0500	0.0	0.0
300 F STEAM	0.0	0.0250	0.0550	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.5100	0.4400	0.3800	0.5850	0.0
IRRECOVERABLE LOSSES	0.0840	0.0850	0.0860	0.0828	0.0
SENSIBLE HEAT	0.6960	0.6750	0.6540	0.7222	0.0
DIRECT HEAT AVAILABLE	0.6960	0.6750	0.6540	0.7222	0.0
CLEANLINESS INDICATOR	2.0	2.0	2.0	2.0	0.0
DIG. HEAT TEMPERATURE (F)	1002.0	904.0	832.0	832.0	0.0
HEAT SOURCE NO. = 13.					
HEAT REJECTION NO. = 0.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	1.200
NOX OUTPUT	0.200
CH4 OUTPUT	0.0
PARTICULATE OUTPUT	0.001
SOLID WASTES	33.000

COST DATA AT 30.0MW (19/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	91.00	24.00
3.2 PRIMARY GENERATOR	36.00	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0

3.6 HEAT RECOVERY (15/MBTU @)	5100.00	1800.00
• AT 100 MBTU/HR		

O & M COSTS (CENTS/KWH) 0.30

SPACE DATA AT 30.0MW

SPECIFIC AREA (FT2/KW)	0.07
SPECIFIC VOLUME (FT3/KW)	2.28
SPECIFIC WEIGHT (LBS/KW)	21.00

INSTALLATION TIME (YEARS) 1.

Power Systems Division

NO.16 ADVANCED TECHNOLOGY GAS TURBINE, INDIRECT FIRED, CIAL (AFR)

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 100.00 100.00 100.00 0.0 0.0
MINIMUM POWER (MW) 2.00 2.00 2.00 0.0 0.0
NOMINAL POWER (MW) 30.00 30.00 30.00 0.0 0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY 0.1600 0.1450 0.1130 0.0 0.0
HOT WATER 0.0 0.0 0.0 0.0 0.0
300 F STEAM 0.0 0.0 0.0 0.0 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.6700 0.6850 0.7020 0.0 0.0
IRRECOVERABLE LOSSES 0.0810 0.0802 0.0786 0.0 0.0
SENSIBLE HEAT 0.7590 0.7748 0.8084 0.0 0.0
DIRECT HEAT AVAILABLE 0.1590 0.1748 0.8084 0.0 0.0
CLEANLINESS INDICATOR 1.0 1.0 1.0 0.0 0.0
DIR. HEAT TEMPERATURE (F) 819.0 819.0 819.0 0.0 0.0

HEAT SOURCE NO. = 12.

HEAT REJECTION NO. = 0.

HEAT REJECTION FRACTION 0.0 0.0 0.0 0.0 0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT 1.200
NOX OUTPUT 0.200
COX OUTPUT 0.0
PARTICULATE OUTPUT 0.100
SOLID WASTES 42.000

COST DATA AT 30.0MW (\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0
3.1 PRIMARY CONVERTER 91.00 24.00
3.2 PRIMARY GENERATOR 36.00 0.0
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0

3.6 HEAT RECOVERY (\$/MBTU *) 5100.00 1800.00
* AT 100 MBTU/HR

0 C M COSTS (CENTS/KWH) 0.10

SPACE DATA AT 30.0MW

SPECIFIC AREA (F12/KW) 0.07
SPECIFIC VOLUME (F12/KW) 2.24
SPECIFIC WEIGHT (LBS/KW) 21.00

INSTALLATION TIME (YEARS) 1.

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Power Systems Division

NO.17 ADVANCED TECHNOLOGY GAS TURBINE-CLOSED CYCLE COAL DER. B.G.

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	100.00	100.00	100.00
MINIMUM POWER (MW)	5.00	5.00	5.00	5.00	5.00
NOMINAL POWER (MW)	10.00	10.00	10.00	30.00	30.00
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.3150	0.2300	0.2820	0.2650	0.2050
HOT WATER	0.1680	0.0200	0.1490	0.1730	0.1050
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.3870	0.6250	0.4390	0.4320	0.5650
IRRECOVERABLE LOSSES	0.0508	0.0465	0.0491	0.0482	0.0452
SENSIBLE HEAT	0.6342	0.7235	0.6689	0.6868	0.7498
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 1.					
HEAT REJECTION FRACTION	0.8670	0.8710	0.8690	0.8700	0.8720

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EMISSIONS DATA (LBS/MILLION BTU)

SO2 INPUT	0.824
NOX OUTPUT	0.500
COX OUTPUT	0.020
PARTICULATE INPUT	0.100
SOLID WASTES	0.053

COST DATA AT 30.0MW (1/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0
3.1 PRIMARY CONVERTER	27.00
3.2 PRIMARY GENERATOR	36.00
3.3 SECONDARY CONVERTER	0.0
3.4 SECONDARY GENERATOR	0.0
3.6 HEAT RECOVERY (1/MW) *	5100.00
* AT 100 MW/HR	1800.00

O & M COSTS (CENTS/KWH) 0.12

SPACE DATA AT 30.0MW

SPECIFIC AREA (FT2/KW)	0.01
SPECIFIC VOLUME (FT3/KW)	1.04
SPECIFIC WEIGHT (LBS/KW)	10.00

INSTALLATION TIME (YEARS) 1.

FCR-1333

Power Systems Division

NO-18 ADVANCED TECHNOLOGY, GAS TURBINE, CLOSED CYCLE, COAL (AFR)

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	100.00	100.00	100.00
MINIMUM POWER (MW)	5.00	5.00	5.00	5.00	5.00
NOMINAL POWER (MW)	30.00	30.00	30.00	30.00	30.00

ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.1900	0.1530	0.2305	0.1000	0.2480
HOT WATER	0.1675	0.0840	0.1405	0.1520	0.1490
300 F STEAM	0.0	0.0	0.1325	0.0	0.1995
500 F STEAM	0.0	0.0	0.3200	0.0	0.2290
700 F STEAM	0.4750	0.6000	0.0	0.5000	0.0
IRRECOVERABLE LOSSES	0.0025	0.0006	0.0949	0.0820	0.0854
SENSIBLE HEAT	0.7275	0.7664	0.6766	0.7380	0.6664
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (°F)	0.0	0.0	0.0	0.0	0.0

HEAT SOURCE NO. 12.					
HEAT REJECTION NO. 1.					
HEAT REJECTION FRACTION	0.8300	0.6320	0.8280	0.8310	0.8280

EMISSIONS DETAILED/MILLION BTU)					
SO2 OUTPUT	1.200				
NOX OUTPUT	0.200				
CHX OUTPUT	0.0				
PARTICULATE OUTPUT	0.100				
SOLID WASTES	42.000				

COST DATA AT 30.0MW (1\$/KW)	EQUIPMENT	INSTALLATION			
2.4 GASIFIER	0.0	0.0			
3.1 PRIMARY CONVERTER	38.00	24.00			
3.2 PRIMARY GENERATOR	36.00	0.0			
3.3 SECONDARY CONVERTER	0.0	0.0			
3.4 SECONDARY GENERATOR	0.0	0.0			
3.6 HEAT RECOVERY (1\$/MBTU * 1)	5100.00	1800.00			
° AT 100 MBTU/HR					

O & M COSTS (CENTS/KWH)	0.00				
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SPACE DATA AT 30.0MW					
SPECIFIC AREA (FT2/KW)	0.02				
SPECIFIC VOLUME (FT3/KW)	1.05				
SPECIFIC WEIGHT (LBS/KW)	10.00				

INSTALLATION TIME (YEARS)	1.				
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Power Systems Division

NO.19 ADVANCED TECHNOLOGY STEAM INJECT.G/T.DIR.FIRED.PETROLFUM B.G.

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 150.00 150.00 0.0 0.0 0.0 0.0
MINIMUM POWER (MW) 10.00 10.00 0.0 0.0 0.0 0.0
NOMINAL POWER (MW) 5.00 5.00 0.0 0.0 0.0 0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY 0.3600 0.3400 0.0 0.0 0.0 0.0
HOT WATER 0.0 0.0 0.0 0.0 0.0 0.0
300 F STEAM 0.0 0.0 0.0 0.0 0.0 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.2050 0.3350 0.0 0.0 0.0 0.0
IRRECOVERABLE LOSSES 0.0610 0.0600 0.0 0.0 0.0 0.0
SENSIBLE HEAT 0.5790 0.6000 0.0 0.0 0.0 0.0
DIRECT HEAT AVAILABLE 0.2020 0.3348 0.0 0.0 0.0 0.0
CLEANLINESS INDICATOR 2.0 2.0 0.0 0.0 0.0 0.0
DIR. HEAT TEMPERATURE(F) 750.0 750.0 0.0 0.0 0.0 0.0

HEAT SOURCE NO. = 0.

HEAT REJECTION NO. = 0.

HEAT REJECTION FRACTION 0.0 0.0 0.0 0.0 0.0 0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT 0.760
NOX OUTPUT 0.500
CHX OUTPUT 0.020
PARTICULATE OUTPUT 0.030
SOLID WASTES 0.0

COST DATA AT 45.0MW (S/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0 0.0
3.1 PRIMARY CONVERTER 51.14 23.14
3.2 PRIMARY GENERATOR 34.71 0.0
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0

3.6 HEAT RECOVERY 22.57 7.74

O & M COSTS (CENTS/KWH) 0.26

SPACE DATA AT 45.0MW

SPECIFIC AREA (FT2/KW) 0.03
SPECIFIC VOLUME (FT3/KW) 1.14
SPECIFIC WEIGHT (LBS/KW) 10.00

INSTALLATION TIME (YEARS) 1.

FCR-1333

NO. 20 ADVANCED TECHNOLOGY STEAM INJECTION, DIR. FIRED, CUAL DER. 0.00

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	150.00	150.00	0.0	0.0	0.0
MINIMUM POWER (MW)	10.00	10.00	0.0	0.0	0.0
NOMINAL POWER (MW)	45.00	45.00	0.0	0.0	0.0

	1	2	3	4	5
ENERGY FRACTION - MINIMAL SIZE	0.3600	0.3400	0.0	0.0	0.0
ELECTRICITY	0.0	0.0	0.0	0.0	0.0
HOT WATER	0.0	0.0	0.0	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.2050	0.3350	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0530	0.0520	0.0	0.0	0.0
SENSIBLE HEAT	0.5070	0.6080	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.2049	0.3350	0.0	0.0	0.0
CLEANLINESS INDICATOR	2.0	2.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	750.0	750.0	0.0	0.0	0.0

	1	2	3	4	5
HEAT SMALL NO. = 0.					
HEAT REJECTION NO. = 0.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

EMISSIONS (TAILS/MILLION BTU)

SO2 OUTPUT	0.820
NOX OUTPUT	0.500
CHX OUTPUT	0.020
PARTICULATE OUTPUT	0.100
SOLID WASTES	0.0

COST DATA AT 45.0MW (10/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	51.14	23.14
3.2 PRIMARY GENERATOR	34.73	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0
3.6 HEAT RECOVERY	22.57	7.74

O & M COSTS (C/MIS/KWH) 0.26

SPACE DATA AT 45.0MW	
SPECIFIC AREA (112/KW)	0.03
SPECIFIC VOLUME (173/KW)	1.14
SPECIFIC WEIGHT (LBS/KW)	10.00

INSTALLATION TIME (YEARS) 1.

Power Systems Division

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NO.21 ADVANCED TECHNOLOGY STEAM INJECT.G/T.DIRECT FIRED.COAL(PFR)

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	150.00	150.00	0.0	0.0	0.0
MINIMUM POWER (MW)	10.00	10.00	0.0	0.0	0.0
NOMINAL POWER (MW)	45.00	45.00	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2900	0.2700	0.0	0.0	0.0
HOT WATER	0.0100	0.0300	0.0	0.0	0.0
300 F STEAM	0.0100	0.0300	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0700	0.1900	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0875	0.0865	0.0	0.0	0.0
SENSIBLE HEAT	0.6225	0.6435	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.0844	0.2497	0.0	0.0	0.0
CLEANLINESS INDICATOR	2.0	2.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE(F)	750.0	750.0	0.0	0.0	0.0
HEAT SOURCE NO.=11.					
HEAT REJECTION NO.=0.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

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EMISSIONS DATA(LBS/MILLION BTU)

SO2 OUTPUT	1.200
NOX OUTPUT	0.200
CHX OUTPUT	0.0
PARTICULATE OUTPUT	0.001
SOLID WASTES	33.000

COST DATA AT 45.0MW (S/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	84.71	23.14
3.2 PRIMARY GENERATOR	34.71	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0
3.6 HEAT RECOVERY	27.29	9.43

0 C M COSTS (CENTS/KWH) 0.28

SPACE DATA AT 45.0MW

SPECIFIC AREA (FT2/KW)	0.07
SPECIFIC VOLUME (FT3/KW)	2.47
SPECIFIC WEIGHT (LBS/KW)	21.00

INSTALLATION TIME (YEARS) 1.

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Power Systems Division

NO.22 ADVANCED TECHNOLOGY STEAM INJECTED G/T INDIRECT FIRED COAL (AFB)

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	150.00	150.00	0.0	0.0	0.0
MINIMUM POWER (MW)	10.00	10.00	0.0	0.0	0.0
NOMINAL POWER (MW)	5.00	45.00	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2500	0.2350	0.0	0.0	0.0
HOT WATER	0.1500	0.1800	0.0	0.0	0.0
300 F STEAM	0.0	0.0250	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.1700	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0850	0.0847	0.0	0.0	0.0
SENSIBLE HEAT	0.6645	0.6603	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.1502	0.3748	0.0	0.0	0.0
CLEANLINESS INDICATOR	1.0	1.0	0.0	0.0	0.0
DRA. HEAT TEMPERATURES	750.0	750.0	0.0	0.0	0.0
HEAT SOURCE NO. 12.					
HEAT REJECTION NO. 0.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	1.200
NOX OUTPUT	0.200
COX OUTPUT	0.0
PARTICULATE OUTPUT	0.100
SOLID WASTES	52.000

COST DATA AT 45.0MW (15/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	84.71	23.14
3.2 PRIMARY GENERATOR	34.71	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0

3.6 HEAT RECOVERY (15/MBTU @)	79.00	9.50
0 AT 100 MW/24/M		

O & M COSTS (CENTS/KWH) 0.12

SPACE DATA AT 45.0MW	
SPECIFIC AREA (FT2/KW)	0.07
SPECIFIC VOLUME (FT3/KW)	2.47
SPECIFIC WEIGHT (LBS/KW)	21.00

INSTALLATION TIME (YEARS) 1.

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Power Systems Division

NO.23 ADVANCED TECHNOLOGY,COMB.CYCLE,DIRECT FIRED,PETROLEUM B.G.

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 150.00 150.00 150.00 0.0 0.0
MINIMUM POWER (MW) 10.00 10.00 10.00 0.0 0.0
MINIMAL POWER (MW) 42.00 42.00 45.00 0.0 0.0

ENERGY FRACTION - MINIMAL SIZE

ELECTRICITY 0.4400 0.4150 0.3850 0.0 0.0
HOT WATER 0.0 0.0 0.0 0.0 0.0
300 F STEAM 0.0 0.0 0.0 0.0 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.1000 0.1950 0.2950 0.0 0.0
IRRECOVERABLE LOSSES 0.0630 0.0630 0.0622 0.0 0.0
SENSIBLE HEAT 0.5950 0.5212 0.5228 0.0 0.0
DIRECT HEAT AVAILABLE 0.2214 0.3169 0.4174 0.0 0.0
CLEANLINESS INDICATOR 2.0 2.0 2.0 0.0 0.0
DRA. HEAT TEMPERATURE (F) 1107.0 1107.0 1109.0 0.0 0.0

HEAT SOURCE NO.= 0.

HEAT REJECTION NO.= 2.

HEAT REJECTION FRACTION 0.2730 0.2040 0.1350 0.0 0.0

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EMISSIONS DATA(LBS/MILLION BTU)

SO2 OUTPUT 0.760
NOX OUTPUT 0.500
CHX OUTPUT 0.020
PARTICULATE OUTPUT 0.030
SOLID WASTES 0.0

COST DATA AT 45.0MW (19/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0 0.0
3.1 PRIMARY CONVERTER 40.36 17.75
3.2 PRIMARY GENERATOR 26.14 0.0
3.3 SECONDARY CONVERTER 35.34 14.55
3.4 SECONDARY GENERATOR 13.14 0.0

3.6 HEAT RECOVERY 10.07 6.57

O & M COSTS (CENTS/KWH) 0.24

SPACE DATA AT 45.0MW

SPECIFIC AREA (FT2/KW) 0.13
SPECIFIC VOLUME (FT3/KW) 0.52
SPECIFIC WEIGHT (LBS/KW) 40.00

INSTALLATION TIME (YEARS) 2.

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NO. 24 ADVANCED TECHNOLOGY, COMB. CICLE, DIRECT FIRED, CHAL. DER. R.G.

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	150.06	150.00	150.00	0.0	0.0
MINIMUM POWER (MW)	10.00	10.00	10.00	0.0	0.0
NOMINAL POWER (MW)	45.00	45.00	45.00	0.0	0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY	0.4400	0.4150	0.3850	0.0	0.0
HOT WATER	0.0	0.0	0.0	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.1000	0.1950	0.2450	0.0	0.0
UNRECOVERABLE LOSSES	0.0790	0.0550	0.0442	0.0	0.0
SENSIBLE HEAT	0.5010	0.5292	0.5408	0.0	0.0
DIRECT HEAT AVAILABLE	0.2076	0.3249	0.4256	0.0	0.0
CLEANLINESS INDICATOR	2.0	2.0	2.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	1109.2	1109.0	1109.0	0.0	0.0

HEAT SOURCE NO. = 0.

HEAT REJECTION NO. = 2.

HEAT REJECTION FRACTION 0.2730 0.2040 0.1350 0.0 0.0

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	0.020
NOX OUTPUT	0.500
CH4 OUTPUT	0.020
PARTICULATE OUTPUT	0.100
SOLID WASTES	0.0

COST DATA AT 45.0MW (19/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	40.16	17.75
3.2 PRIMARY GENERATOR	26.14	0.0
3.3 SECONDARY CONVERTER	35.14	14.45
3.4 SECONDARY GENERATOR	13.14	0.0

3.6 HEAT RECOVERY 10.07 6.52

O & M COSTS (CENTS/KWH) 0.24

SPACE DATA AT 45.0MW

SPECIFIC AREA (FT2/KW)	0.13
SPECIFIC VOLUME (FT3/KW)	0.52
SPECIFIC WEIGHT (LBS/KW)	40.00

INSTALLATION TIME (YEARS) 2.

Power Systems Division

WD-25 ADVANCED TECHNOLOGY-COMBINED CYCLE-DIRECT FIRED-COAL(PFB)

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	150.00	0.0	0.0	0.0	0.0
MINIMUM POWER (MW)	10.00	0.0	0.0	0.0	0.0
MINIMAL POWER (MW)	45.00	0.0	0.0	0.0	0.0
ENERGY FRACTION - MINIMAL SIZE					
ELECTRICITY	0.3050	0.0	0.0	0.0	0.0
HOT WATER	0.0300	0.0	0.0	0.0	0.0
300 F STEAM	0.0400	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.2450	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0082	0.0	0.0	0.0	0.0
SENSIBLE HEAT	0.4068	0.0	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.4468	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	2.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	823.0	0.0	0.0	0.0	0.0

HEAT SOURCE NO. = 13.
HEAT REJECTION NO. = 2.
HEAT REJECTION FRACTION 0.1600 0.0 0.0 0.0 0.0

EMISSIONS TAIL/BS/MILLION BTU					
SO2 OUTPUT	1.200				
NOX OUTPUT	0.200				
CHX OUTPUT	0.0				
PARTICULATE OUTPUT	0.001				
SOLID WASTES	33.000				

COST DATA AT 45.0MW (10/KW) EQUIPMENT INSTALLATION					
2.4 GASIFIER	0.0				
3.1 PRIMARY CONVERTER	73.11				
3.2 PRIMARY GEN'RATOR	28.93				
3.3 SECONDARY CONVERTER	30.46				
3.4 SECONDARY GENERATOR	9.27				
3.6 HEAT RECOVERY	25.10				

O & M COSTS (CENTS/KWH) 0.24

SPACE DATA AT 45.0MW					
SPECIFIC AREA (FT2/KW)	0.17				
SPECIFIC VOLUME (F3/KW)	9.82				
SPECIFIC WEIGHT (LBS/KW)	71.03				

INSTALLATION TIME (YEARS) 1.

FCR-1333

MI-24 ADVANCED TECHNOLOGY, COMBINED CYCLE, INDIRECT FIRED, CRAL (FR)

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	150.00	150.00	0.0	0.0	0.0
MINIMUM POWER (MW)	10.00	10.00	0.0	0.0	0.0
NOMINAL POWER (MW)	45.00	45.00	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2450	0.2470	0.0	0.0	0.0
HOT WATER	0.1657	0.1640	0.0	0.0	0.0
300 F STEAM	0.0433	0.0	0.0	0.0	0.0
900 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.1920	0.3480	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0852	0.0853	0.0	0.0	0.0
SENSIBLE HEAT	0.4098	0.4677	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.5844	0.5702	0.0	0.0	0.0
CLEANLINESS INDICATOR	1.0	1.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	794.0	794.0	0.0	0.0	0.0

HEAT SOURCE MI-12.

HEAT REJECTION NO. = 2.

HEAT REJECTION FRACTION

0.1550 0.1000 0.0 0.0 0.0

EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT 1.200
 NOX OUTPUT 0.200
 CO2 OUTPUT 0.0
 PARTICULATE OUTPUT 0.100
 SOLID WASTES 42.000

COST DATA AT 45.0MW (1974) EQUIPMENT INSTALLATION

2-4 GASIFIER 0.0 0.0
 3-1 PRIMARY CONVERTER 54.93 14.57
 3-2 PRIMARY GENERATOR 27.14 0.0
 3-3 SECONDARY CONVERTER 41.14 16.61
 3-4 SECONDARY GENERATOR 16.34 0.0
 3-6 HEAT RECOVERY 44.57 0.0

U L N COSTS (CENTS/KWH) 0.10

SPACE DATA AT 45.0MW

SPECIFIC AREA (F12/KW) 0.17
 SPECIFIC VOLUME (F13/KW) 9.87
 SPECIFIC WEIGHT (LBS/KW) 71.00

INSTALLATION TIME (YEARS)

1.

Power Systems Division

FCR-1339

MD-27 ADVANCED TECHNOLOGY FUEL CELL LOW TEMP. PETROLEUM DISTILLATE

DESIGN OPTION

	1	2	3	4	5
ENERGY LUMENSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	0.0	0.0	0.0
MINIMUM POWER (MW)	0.40	0.40	0.0	0.0	0.0
NOMINAL POWER (MW)	12.00	12.00	0.0	0.0	0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY	0.3670	0.3670	0.0	0.0	0.0
HOT WATER	0.3900	0.3900	0.0	0.0	0.0
300 F STEAM	0.1030	0.1080	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0800	0.0800	0.0	0.0	0.0
SENSIBLE HEAT	0.5522	0.5522	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
AIR HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0

HEAT SOURCE NO. = 0.

HEAT REJECTION NO. = 0.

HEAT REJECTION FRACTION

	0.0	0.0	0.0	0.0	0.0
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EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	0.0
NOX OUTPUT	0.016
CO OUTPUT	0.0
PARTICULATE OUTPUT	0.0
SOLID WASTES	0.0

COST DATA AT 12.0MW (19/KW) EQUIPMENT INSTALLATION

2-4 GASIFIER	0.0	0.0
1-1 PRIMARY CONVERTER	226.70	10.00
3-2 PRIMARY GENERATOR	50.00	0.0
3-3 SECONDARY CONVERTER	0.0	0.0
3-4 SECONDARY GENERATOR	0.0	0.0
3-6 HEAT RECOVERY	12.00	0.0

O & M COSTS (CENTS/KWH) 0.22

SPACE DATA AT 12.0MW

SPECIFIC AREA (FT ² /KW)	1.50
SPECIFIC VOLUME (FT ³ /KW)	24.00
SPECIFIC WEIGHT (LBS/KW)	0.0

INSTALLATION TIME (YEARS)

1.

NO-28 ADVANCED TECHNOLOGY, FUEL CELL, LOW TEMP. COAL DERIVED DIST

	DESIGN OPTION				
	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	0.0	0.0	0.0
MINIMUM POWER (MW)	0.40	0.40	0.0	0.0	0.0
NOMINAL POWER (MW)	12.00	12.00	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.3670	0.3300	0.0	0.0	0.0
HOT WATER	0.4400	0.0750	0.0	0.0	0.0
300 F STEAM	0.0530	0.4050	0.0	0.0	0.0
500 F STEAM	0.0	0.0900	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0692	0.0473	0.0	0.0	0.0
SENSIBLE HEAT	0.5638	0.5027	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 0.	0.0	0.0	0.0	0.0	0.0
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0
EMISSIONS DATA (LBS/MILLION BTU)					
SO2 OUTPUT	0.570				
NOX OUTPUT	0.042				
CHX INPUT	0.0				
PARTICULATE INPUT	0.034				
SOLID WASTES	0.0				
COST DATA AT 12.0MW (\$/KW) EQUIPMENT INSTALLATION					
2.4 GASIFIER	0.0	0.0	0.0		
3.1 PRIMARY CONVERTER	302.00	10.00			
3.2 PRIMARY GENERATOR	50.00	0.0			
3.3 SECONDARY CONVERTER	0.0	0.0			
3.4 SECONDARY GENERATOR	0.0	0.0			
3.6 HEAT RECOVERY	40.00	0.0			
O & M COSTS (CENTS/KWH)	0.29				
SPACE DATA AT 12.0MW					
SPECIFIC AREA (FT ² /KW)	1.50				
SPECIFIC VOLUME (FT ³ /KW)	24.00				
SPECIFIC WEIGHT (LBS/KW)	0.0				
INSTALLATION TIME (YEARS)	1.				

Power Systems Division

FCR-1333

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NO. 20 ADVANCED TECHNOLOGY FUEL CELL-HIGH TEMP. PETROLEUM DIST.

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	0.0	0.0	0.0
MINIMUM POWER (MW)	0.40	0.40	0.0	0.0	0.0
NOMINAL POWER (MW)	12.00	12.00	0.0	0.0	0.0
ENERGY FRACTION - MINIMAL SIZE					
ELECTRICITY	0.4550	0.3590	0.0	0.0	0.0
HOT WATER	0.3400	0.3500	0.0	0.0	0.0
300 F STEAM	0.0150	0.0350	0.0	0.0	0.0
500 F STEAM	0.0450	0.1560	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0852	0.0804	0.0	0.0	0.0
SENSIBLE HEAT	0.4594	0.5606	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 0.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO2 OUTPUT	0.510
NOX OUTPUT	0.083
COX OUTPUT	0.0
PARTICULATE OUTPUT	0.0
SOLID WASTES	0.0

COST DATA AT 12.0MW (1\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0
3.1 PRIMARY CONVERTER	276.20
3.2 PRIMARY GENERATOR	50.00
3.3 SECONDARY CONVERTER	0.0
3.4 SECONDARY GENERATOR	0.0
3.6 HEAT RECOVERY	10.00
	0.0

O & M COSTS (CENTS/KWH) 0.27

SPACE DATA AT 12.0MW

SPECIFIC AREA (F12/KW)	1.50
SPECIFIC VOLUME (F13/KW)	24.00
SPECIFIC WEIGHT (LBS/KW)	0.0

INSTALLATION TIME (YEARS) 1.

Power Systems Division

FCR-1333

NO.30 ADVANCED TECHNOLOGY,FUEL CELL, HIGH TEMP, COAL DER. DIST.

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 100.00 100.00 100.00 100.00 0.0
MINIMUM POWER (MW) 0.40 0.40 0.40 0.40 0.0
NOMINAL POWER (MW) 12.00 12.00 12.00 12.00 0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY 0.4550 0.3590 0.3590 0.3590 0.0
HOT WATER 0.3950 0.4300 0.0900 0.0900 0.0
300 F STEAM 0.0350 0.0 0.0200 0.0850 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.0 0.1110 0.4210 0.0850 0.0
IRRECOVERABLE LOSSES 0.0736 0.0688 0.0687 0.0687 0.0
SENSIBLE HEAT 0.4714 0.5722 0.5723 0.5723 0.0
DIRECT HEAT AVAILABLE 0.0 0.0 0.0 0.2710 0.0
CLEANLINESS INDICATOR 0.0 0.0 0.0 1.0 0.0
DIR. HEAT TEMPERATURE (F) 0.0 0.0 0.0 1000.0 0.0

HEAT SOURCE NO.= 0.

HEAT REJECTION NO.= 0.

HEAT REJECTION FRACTION 0.0 0.0 0.0 0.0 0.0

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EMISSIONS (TAILS/MILLION BTU)

SO2 OUTPUT 0.570
NOX OUTPUT 0.087
COX OUTPUT 0.0
PARTICULATE OUTPUT 0.034
SOLID WASTES 0.0

COST DATA AT 12.0MW (\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0
3.1 PRIMARY CONVERTER 218.50 10.00
3.2 PRIMARY GENERATOR 50.00 0.0
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0
3.6 HEAT RECOVERY 20.00 0.0

O & M COSTS (CENTS/KWH) 0.23

SPACE DATA AT 12.0MW

SPECIFIC AREA (FT2/KW) 1.50
SPECIFIC VOLUME (FT3/KW) 24.00
SPECIFIC WEIGHT (LBS/KW) 0.0

INSTALLATION TIME (YEARS) 1.

MU-31 ADVANCED TECHNOLOGY FUEL CELL-HIGH TEMP.- COAL GASIFIER

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	200.00	0.0	0.0	0.0	0.0
MINIMUM POWER (MW)	17.00	0.0	0.0	0.0	0.0
NOMINAL POWER (MW)	100.00	0.0	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2760	0.0	0.0	0.0	0.0
HOT WATER	0.1500	0.0	0.0	0.0	0.0
300 F STEAM	0.0300	0.0	0.0	0.0	0.0
500 F STEAM	0.0100	0.0	0.0	0.0	0.0
700 F STEAM	0.2440	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.1350	0.0	0.0	0.0	0.0
SENSIBLE HEAT	0.5887	0.0	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 0.					
HEAT REJECTION FRACTION	0.0	0.0	0.0	0.0	0.0
EMISSIONS DATA (LBS./MILLION Btu)					
SO2 OUTPUT	0.070				
NOX OUTPUT	0.201				
CHX OUTPUT	0.0				
PARTICULATE OUTPUT	0.0				
SOLID WASTES	0.0				
COST DATA AT 100.0MW (19/KW)					
2.4 GASIFIER	370.00			120.00	
3.1 PRIMARY CONVERTER	150.00			10.00	
3.2 PRIMARY GENERATOR	50.00			0.0	
3.3 SECONDARY CONVERTER	0.0			0.0	
3.4 SECONDARY GENERATOR	0.0			0.0	
3.6 HEAT RECOVERY	20.00			0.0	
O & M COSTS (CENTS/KWH)	0.30				
SPACE DATA AT 100.0MW					
SPECIFIC AREA (F12/KW)	2.50				
SPECIFIC VOLUME (F13/KW)	24.00				
SPECIFIC WEIGHT (LBS/KW)	0.0				
INSTALLATION TIME (YEARS)	3.				

NO. 12 ADVANCED TECHNOLOGY, STIRLING ENGINE, COAL DERIVED BOILER GRADE

Power Systems Division

FCR-1333

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	30.00	30.00	0.0	0.0	0.0
MINIMUM POWER (MW)	0.50	0.50	0.0	0.0	0.0
NOMINAL POWER (MW)	30.00	30.00	0.0	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.4000	0.2150	0.0	0.0	0.0
HOT WATER	0.2470	0.1390	0.0	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.1480	0.0360	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0550	0.0458	0.0	0.0	0.0
SENSIBLE HEAT	0.5450	0.7392	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIN. HEAT TEMPERATURE(F)	0.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 7.					
HEAT REJECTION NO. = 1.					
HEAT REJECTION FRACTION	0.0350	0.0570	0.0	0.0	0.0
EMISSIONS DATA (LBS/MILLION BTU)					
SO2 OUTPUT	0.024				
NOX OUTPUT	0.500				
CHX OUTPUT	0.020				
PARTICULATE OUTPUT	0.100				
SOLID WASTES	0.053				
COST DATA AT 30.0MW (1\$/KW) EQUIPMENT INSTALLATION					
2.4 GASIFIER	0.0	0.0	0.0		
3.1 PRIMARY CONVERTER	164.00	5.90			
3.2 PRIMARY GENERATOR	21.00	0.0			
3.3 SECONDARY CONVERTER	0.0	0.0			
3.4 SECONDARY GENERATOR	0.0	0.0			
3.6 HEAT RECOVERY	55.50	0.0			
O & M COSTS (CENTS/KWH) 0.45					
SPACE DATA AT 30.0MW					
SPECIFIC AREA (FT2/KW)	0.04				
SPECIFIC VOLUME (FT3/KW)	1.00				
SPECIFIC WEIGHT (LBS/KW)	50.00				
INSTALLATION TIME (YEARS)	1.				

NO.33 ADVANCED TECHNOLOGY, STIRLING ENGINE, CIAL (AFR)

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	10.00	30.00	0.0	0.0	0.0
MINIMUM POWER (MW)	0.50	0.50	0.0	0.0	0.0
NOMINAL POWER (MW)	20.00	30.00	0.0	0.0	0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY	0.3800	0.2100	0.0	0.0	0.0
HOT WATER	0.3100	0.1650	0.0	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0600	0.3800	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0920	0.0835	0.0	0.0	0.0
SENSIBLE HEAT	0.5280	0.7065	0.0	0.0	0.0
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0

HEAT SOURCE NO.=12.

HEAT REJECTION NO.=1.

HEAT REJECTION FRACTION

0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO ₂ OUTPUT	1.200
NO _x OUTPUT	0.200
CH ₄ OUTPUT	0.0
PARTICULATE OUTPUT	0.100
SOLID WASTES	42.000

COST DATA AT 30.0MW (\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER	0.0	0.0
3.1 PRIMARY CONVERTER	124.00	5.90
3.2 PRIMARY GENERATOR	21.90	0.0
3.3 SECONDARY CONVERTER	0.0	0.0
3.4 SECONDARY GENERATOR	0.0	0.0

3.6 HEAT RECOVERY 46.00 0.0

O & M COSTS (CENTS/KWH) 0.45

SPACE DATA AT 30.0MW

SPECIFIC AREA (F ² /KW)	0.00
SPECIFIC VOLUME (F ³ /KW)	1.00
SPECIFIC WEIGHT (LBS/KW)	50.00

INSTALLATION TIME (YEARS)

1.

NO.34 ADVANCED TECHNOLOGY, THERMIONICS, COAL DERIVED BOILER GRADE

Power Systems Division

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 100.00 100.00 0.0 0.0 0.0
MINIMUM POWER (MW) 1.00 1.20 0.0 0.0 0.0
NOMINAL POWER (MW) 7.21 5.24 0.0 0.0 0.0

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY 0.1740 0.1231 0.0 0.0 0.0
HOT WATER 0.0 0.0 0.0 0.0 0.0
300 F STEAM 0.0 0.0 0.0 0.0 0.0
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.7000 0.7450 0.0 0.0 0.0
IRRECOVERABLE LOSSES 0.0440 0.0412 0.0 0.0 0.0
SENSIBLE HEAT 0.7820 0.9357 0.0 0.0 0.0
DIRECT HEAT AVAILABLE 0.3237 0.3427 0.0 0.0 0.0
CLEANLINESS INDICATOR 2.0 2.0 0.0 0.0 0.0
DIR. HEAT TEMPERATURE (E) 1100.0 890.0 0.0 0.0 0.0

HEAT SOURCE NO. = 9.

HEAT REJECTION NO. = 1.

HEAT REJECTION FRACTION 0.3500 0.5340 0.0 0.0 0.0

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EMISSIONS DATA (LBS/MILLION BTU)

SO₂ OUTPUT 0.824
NOX OUTPUT 0.500
CH₄ OUTPUT 0.020
PARTICULATE OUTPUT 0.100
SOLID WASTES 0.053

COST DATA AT 7.2MW (\$/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0 0.0
3.1 PRIMARY CONVERTER 431.96 22.20
3.2 PRIMARY GENERATOR 51.10 4.35
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0

3.6 HEAT RECOVERY 0.0 0.0

O & M COSTS (CENTS/KWH) 0.18

SPACE DATA AT 7.2MW

SPECIFIC AREA (F²/KW) 0.0
SPECIFIC VOLUME (F³/KW) 0.0
SPECIFIC WEIGHT (LBS/KW) 62.00

INSTALLATION TIME (YEARS) 1.

FCR-1333

Power Systems Division

FCR-1333

ORIGINAL PAGE IS
OF POOR QUALITY

NO.35 ADVANCED TECHNOLOGY, THERMIONICS, COAL DER. R.G. (COMP. CONFIG.)

	DESIGN OPTION				
	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	100.00	100.00	100.00	0.0	0.0
MINIMUM POWER (MW)	1.30	1.15	1.50	0.0	0.0
NOMINAL POWER (MW)	12.04	6.19	11.00	0.0	0.0
ENERGY FRACTION - NOMINAL SIZE					
ELECTRICITY	0.2821	0.1946	0.2615	0.0	0.0
HOT WATER	0.0	0.0	0.0	0.0	0.0
300 F STEAM	0.0	0.0	0.4600	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.3050	0.5200	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.0491	0.0447	0.0481	0.0	0.0
SENSIBLE HEAT	0.6684	0.7607	0.6904	0.0	0.0
DIRECT HEAT AVAILABLE	0.3364	0.5727	0.5022	0.0	0.0
CLFALTNES INDICATOR	2.0	2.0	2.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	1100.0	890.0	890.0	0.0	0.0
HEAT SOURCE NO. = 9.					
HEAT REJECTION NO. = 2.					
HEAT REJECTION FRACTION	0.2500	0.1060	0.1060	0.0	0.0

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EMISSIONS (TALS/MILLION BTU)	
SO2 OUTPUT	0.824
NOX OUTPUT	0.500
CHX OUTPUT	0.020
PARTICULATE OUTPUT	0.100
SOLID WASTES	0.053

COST DATA AT 12.1MW (\$/KW) EQUIPMENT INSTALLATION	
2.4 GP/STER	0.0
3.1 PRIMARY CONVERTER	266.36
3.2 PRIMARY GENERATOR	31.08
3.3 SECONDARY CONVERTER	83.78
3.4 SECONDARY GENERATOR	35.65
3.6 HEAT RECOVERY	0.0

O & M COSTS (CENTS/KWH)	0.13
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SPACE DATA AT 12.1MW	
SPECIFIC AREA (FT2/KW)	0.13
SPECIFIC VOLUME (F3/KW)	0.56
SPECIFIC WEIGHT (LBS/KW)	46.00

INSTALLATION TIME (YEARS)	1.
---------------------------	----

Power Systems Division

NO. 36 CURRENT TECHNOLOGY STEAM TURBINE, 615 PSIA (EXT), BOTTOMING

DESIGN OPTION

1 2 3 4 5

ENERGY CONVERSION SYSTEM

MAXIMUM POWER (MW) 200.00 200.00 200.00 200.00 200.00
MINIMUM POWER (MW) 2.00 2.00 2.00 2.00 2.00
NOMINAL POWER (MW) 18.00 18.00 18.00 18.00 18.00

ENERGY FRACTION - NOMINAL SIZE

ELECTRICITY 0.1306 0.1024 0.0746 0.0464 0.0324
HOT WATER 0.0 0.0 0.0 0.0 0.0
300 F STEAM 0.0640 0.0640 0.0640 0.0640 0.0640
500 F STEAM 0.0 0.0 0.0 0.0 0.0
700 F STEAM 0.0 0.1120 0.2236 0.3310 0.3964
IRRECOVERABLE LOSSES 0.3020 0.3010 0.3000 0.2980 0.2960
SENSIBLE HEAT 0.5675 0.5966 0.6254 0.6536 0.6716
DIRECT HEAT AVAILABLE 0.0 0.0 0.0 0.0 0.0
CLEANLINESS INDICATOR 0.0 0.0 0.0 0.0 0.0
DIR. HEAT TEMPERATURE (F) 0.0 0.0 0.0 0.0 0.0

HEAT SOURCE NO. = 14.

HEAT REJECTION NO. = 2.

HEAT REJECTION FRACTION 0.3350 0.2910 0.1670 0.0880 0.0370

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EMISSIONS DATA (LBS/MILLION BTU)

SO₂ OUTPUT 0.0
NO_x OUTPUT 0.0
CH₄ OUTPUT 0.0
PARTICULATE OUTPUT 0.0
SOLID WASTES 0.0

COST DATA AT 18.0MW (1/KW) EQUIPMENT INSTALLATION

2.4 GASIFIER 0.0 0.0
3.1 PRIMARY CONVERTER 110.40 6.92
3.2 PRIMARY GENERATOR 49.20 0.0
3.3 SECONDARY CONVERTER 0.0 0.0
3.4 SECONDARY GENERATOR 0.0 0.0
3.6 HEAT RECOVERY 0.0 0.0

O & M COSTS (CENTS/KWH) 0.06

SPACE DATA AT 18.0MW

SPECIFIC AREA (FT²/KW) 0.0
SPECIFIC VOLUME (FT³/KW) 0.96
SPECIFIC WEIGHT (LBS/KW) 15.23

INSTALLATION TIME (YEARS) 1.

FCR-1333

Power Systems Division

NO. 36 CURRENT TECHNICAL STATION TURBINE GAS PSIA/TEXT, BOTTOMING

	1	2	3	4	5
DESIGN OPTION					
ENERGY CONVERSION SYSTEM	200.00	200.00	200.00	200.00	200.00
MAXIMUM POWER (MW)	2.00	2.00	2.00	2.00	2.00
MINIMUM POWER (MW)	18.00	18.00	18.00	18.00	18.00
ENERGY FRACTION - MINIMAL SIZE					
ELECTRICITY	0.1356	0.1198	0.1056	0.0904	0.0832
HOT WATER	0.0	0.0	0.0	0.0	0.0
300 F STEAM	0.0640	0.1592	0.2556	0.3512	0.4090
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.3030	0.3020	0.3010	0.3000	0.3000
SENSIBLE HEAT	0.5614	0.5742	0.5934	0.6096	0.6168
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANNESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0
HEAT SOURCE NO. = 14.					
HEAT REJECTION NO. = 2.					
HEAT REJECTION FRACTION	0.3290	0.2500	0.1680	0.0880	0.0370

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EMISSIONS DATA (LBS/MILLION BTU)					
SO2 OUTPUT	0.0				
NOX OUTPUT	0.0				
CHX OUTPUT	0.0				
PARTICULATE OUTPUT	0.0				
SOLID WASTES	0.0				
COST DATA AT 18.04W (16/KW) EQUIPMENT INSTALLATION					
2.4 GASIFIER	0.0				
3.1 PRIMARY CONVERTER	111.40				
3.2 PRIMARY GENERATOR	46.20				
3.3 SECONDARY CONVERTER	0.0				
3.4 SECONDARY GENERATOR	0.0				
3.6 HEAT RECOVERY	0.0				

0 L H COSTS (CENTS/KWH)	0.04
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SPACE DATA AT 18.04W	
SPECIFIC AREA (FT2/KW)	0.0
SPECIFIC VOLUME (FT3/KW)	0.90
SPECIFIC WEIGHT (LBS/KW)	15.27

INSTALLATION TIME (YEARS)	1.
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FCR-1338

WD-37 ADVANCED TECHNOLOGY, ORGANIC RANKINE BOTTOMING

DESIGN OPTION

	1	2	3	4	5
ENERGY CONVERSION SYSTEM					
MAXIMUM POWER (MW)	2.23	4.40	1.74	0.0	0.0
MINIMUM POWER (MW)	0.20	0.55	0.21	0.0	0.0
NOMINAL POWER (MW)	0.70	1.94	0.76	0.0	0.0

	1	2	3	4	5
ENERGY FRACTION - MINIMAL SIZE					
ELECTRICITY	0.1270	0.1702	0.1292	0.0	0.0
HOT WATER	0.4057	0.0	0.0	0.0	0.0
300 F STEAM	0.0	0.0	0.0	0.0	0.0
500 F STEAM	0.0	0.0	0.0	0.0	0.0
700 F STEAM	0.0	0.0	0.0	0.0	0.0
IRRECOVERABLE LOSSES	0.2280	0.1180	0.1450	0.0	0.0
SENSIBLE HEAT	0.6442	0.7110	0.7098	0.0	0.0
DIRECT HEAT AVAILABLE	0.0	0.0	0.0	0.0	0.0
CLEANLINESS INDICATOR	0.0	0.0	0.0	0.0	0.0
DIR. HEAT TEMPERATURE (F)	0.0	0.0	0.0	0.0	0.0

	1	2	3	4	5
HEAT SOURCE NO. = 0.					
HEAT REJECTION NO. = 2.					
HEAT REJECTION FRACTION	0.4020	0.5040	0.4260	0.0	0.0

	1	2	3	4	5
EMISSIONS DATA (LBS/MILLION BTU)					
SO ₂ OUTPUT	0.0				
NOX OUTPUT	0.0				
CH ₄ OUTPUT	0.0				
PARTICULATE INPUT	0.0				
SOLID WASTES	0.0				

	1	2	3	4	5
COST DATA AT 0.0000 \$/KW EQUIPMENT INSTALLATION					
2.4 GASIFIER	0.0				
3.1 PRIMARY CONVERTER	166.06	49.95			
3.2 PRIMARY GENERATOR	34.85	10.46			
3.3 SECONDARY CONVERTER	0.0	0.0			
3.4 SECONDARY GENERATOR	0.0	0.0			
3.6 HEAT RECOVERY	147.41	44.22			

	1	2	3	4	5
O & M COSTS (CENTS/KWH) 0.50					

	1	2	3	4	5
SPACE DATA AT 0.0000					
SPECIFIC AREA (FT ² /KW)	0.31				
SPECIFIC VOLUME (FT ³ /KW)	2.87				
SPECIFIC WEIGHT (LBS/KW)	40.00				

	1	2	3	4	5
INSTALLATION TIME (YEARS) 0.					

TABLE VI-11
INDUSTRIAL PROCESS CHARACTERISTICS - 1985

Power Systems Division

FCR-1333

ORIGINAL PAGE IS
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ML 1 SEC 2011 MEAT PACKING

TIME FRAME: 1978.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

ELECTRIC REQUIREMENTS

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

100 F WATER
200 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT (FUEL=1.00)
INDIRECT HEAT (FUEL=1.00)
USEFUL PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0)

AVERAGE ANNUAL F/T

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/F

NATIONAL ANNUAL PRODUCTION(TONS)

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER 4

T OF SEC REPRESENTED BY PRODUCT

NO. 1 SEC 2011 MEAT PACKING

TIME FRAME: 1975.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

ELECTRICAL REQUIREMENTS
UNIT ELECTRICAL CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

100 F WATER
100 F STEAM
200 F STEAM
200 F STEAM
DIRECT HEAT(LF=1.00, FUEL=1.00)
USEFUL PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)

AVERAGE ANNUAL F/T

DAILY CORRELATION FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE F/T

NATIONAL ANNUAL PRODUCTION(TONS)

FUEL REQUIREMENT FRACTIONS
COAL
OIL
NATURAL GAS
OTHER
OTHER

T OF SEC REPRESENTED BY PRODUCT

FCR-1333

NO. 1 STEEL MEAT PACKING

TIME FRAME: 2000.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION (TONS) 200000.
 DAILY PLANT PRODUCTION (TONS) 641.
 PRODUCTIVE DAYS PER YEAR 312.
 NON-PRODUCTIVE DAYS PER YEAR 53.

ELECTRICAL REQUIREMENTS
 UNIT ELECTRIC CONSUMPTION (KWH/TON) 177.3 12.5
 PEAK ELECTRICAL DEMAND (MW) 6.216 3.007
 AVERAGE ELECTRICAL DEMAND (MW) 4.737 1.560
 ELECTRIC LOAD FACTOR (TYPICAL DAY) 0.807 0.912

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

HOT WATER 140.0 0.067
 300 P STEAM 315.0 0.045
 500 P STEAM 500.0 0.0
 700 P STEAM 700.0 0.0
 DIRECT HEAT (FAN=1.00, FUEL=1.00) 2000.0 0.0
 USEABLE PROCESS HEAT 0.0 0.0
 FV-PRODUCT FUEL AVAILABLE (TYPE=0.6) 0.0 0.0

AVERAGE ANNUAL F/T 0.309 0.377

LOW HIGH

DAILY OUTCUT/INCL FACTOR RANGE
 SEASONAL VARIATION OF DAILY AVERAGE F/T 0.867 1.100
 0.240 0.432

NATIONAL ANNUAL PRODUCTION (TONS) 0.2591E+08

FUEL BREAKDOWN FRACTIONS
 COAL 0.205
 OIL 0.134
 NATURAL GAS 0.625
 OTHER 0.036
 OTHER 0.0

% OF STEEL REPRESENTED BY PRODUCT 100.000

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Power Systems Division

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NO. 2 SIC 2041 BAKING INDUSTRY: MEAT, LAKES

TIME FRAME: 1978.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 15660.
DAILY PLANT PRODUCTION(TONS) 58.
PRODUCTIVE DAYS PER YEAR 260.
NON-PRODUCTIVE DAYS PER YEAR 105.

TECHNICAL REQUIREMENTS	PROD	MIN-PROD
NET ELECTRIC CONSUMPTION(KWH/TON)	126.1	16.4
PEAK ELECTRICAL DEMAND(MW)	0.347	0.101
AVERAGE ELECTRICAL DEMAND(MW)	0.303	0.101
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.874	1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER	180.F	0.033	0.006
300 F STEAM	290.F	0.660	0.112
500 F STEAM	500.F	0.0	0.0
700 F STEAM	700.F	0.0	0.0
DIRECT HEAT CLEAN=1.00, FUEL=1.00	500.F	1.282	0.104
USEABLE PROCESS HEAT	0.F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0	0.0

AVERAGE ANNUAL F/T	0.218	0.261
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LOW HIGH

DAILY COINCIDENCE FACTOR RANGE	0.767	1.144
SEASONAL VARIATION OF DAILY AVERAGE E/T	0.218	0.218

NATIONAL ANNUAL PRODUCTION(TONS) 0.101666

FUEL REQUIREMENT FRACTIONS

COAL	0.0
OIL	0.114
NATURAL GAS	0.815
OTHER	0.271
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT 100.000

NO. 2 SIC 2051 PAKING INDUSTRY:INFEAD, CARFS

TIME FRAME: 1985.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 15000.
DAILY PLANT PRODUCTION(TONS) 56.
PRODUCTIVE DAYS PER YEAR 266.
NON-PRODUCTIVE DAYS PER YEAR 105.

ELECTRICAL REQUIREMENTS

	PROD	NON-PROD
UNIT ELECTRICAL CONSUMPTION(KWH/TON)	116.4	15.5
PEAK ELECTRICAL DEMAND(MW)	0.320	0.092
AVERAGE ELECTRICAL DEMAND(MW)	0.280	0.097
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.874	1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER	180°F	0.028	0.005
300°F STEAM	250°F	0.523	0.096
500°F STEAM	500°F	0.0	0.0
700°F STEAM	700°F	0.0	0.0
DIRECT HEAT(CLEAN=1.00,FUEL=1.00)	500°F	1.044	0.088
USABLE PROCESS HEAT	0°F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=3.0)	0.0	0.0	0.0

AVERAGE ANNUAL E/T

	0.236	0.280
--	-------	-------

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

	0.767	1.144
	0.236	0.236

DAILY ANNUAL PRODUCTION(TONS)

0.1085E+06

FUEL BREAKDOWN FRACTIONS

COAL	0.0
OIL	0.314
NATURAL GAS	0.615
OTHER	0.271
OTHER	3.6

% OF SIC REPRESENTED BY PRODUCT

100.000

FCR-1333

Power Systems Division

FCR-1333

NO. 2 SEC 2051 BAKING INDUSTRIES/BEAD, CAR, S

TIME FRAME: 2000.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 15060.
DAILY PLANT PRODUCTION(TONS) 58.
PRODUCTIVE DAYS PER YEAR 260.
NON-PRODUCTIVE DAYS PER YEAR 102.

ELECTRICAL REQUIREMENTS PROD MIN-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON) 110.1 14.8
PEAK ELECTRICAL DEMAND(MW) 0.303 0.088
AVERAGE ELECTRICAL DEMAND(MW) 0.265 0.088
ELECTRIC LOAD FACTOR(TYPICAL DAY) 0.874 1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 120.F 0.025 0.004
300 F STEAM 250.F 0.497 0.084
500 F STEAM 500.F 0.0 0.0
700 F STEAM 700.F 0.0 0.0
DIRECT HEAT(CLEAN=1.00, FUEL=1.00) 0.566 0.078
USABLE PROCESS HEAT 0.0 0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0) 0.0 0.0

AVERAGE ANNUAL E/T 0.253 0.302

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE 0.767 1.144
SEASONAL VARIATION OF DAILY AVERAGE E/T 0.253 0.253

NATIONAL ANNUAL PRODUCTION(TONS) 0.1210E+08

FUEL BREAKDOWN FRACTIONS
COAL 0.0
OIL 0.114
NATURAL GAS 0.615
OTHER 0.271
OTHER 0.0

% OF SEC REPRESENTED BY PRODUCT 100.000

ORIGINAL PAGE IS
OF POOR QUALITY

NO. 3 SIC 2002 MALT BEVERAGES

TIME FRAME: 1974

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(BARRELS) 210,000
DAILY PLANT PRODUCTION(BARRELS) 549
PRODUCTIVE DAYS PER YEAR 305
NON-PRODUCTIVE DAYS PER YEAR 0

ELECTRICAL REQUIREMENTS

	PROD	NON-PROD
UNIT ELECTRIC CONSUMPTION(KWH/MHARREL)	9.5	0.0
PEAK ELECTRICAL DEMAND(MW)	2.718	0.0
AVERAGE ELECTRICAL DEMAND(MW)	2.174	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.800	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/MHARREL)

	140.F	0.0	0.0
HOT WATER			
300 F STEAM	300.F	0.235	0.0
500 F STEAM	500.F	0.0	0.0
700 F STEAM	700.F	0.0	0.0
DIRECT HEAT(CLEAN=1.00, FUEL=1.00)	400.F	0.010	0.0
USEABLE PROCESS HEAT	0.F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0	0.0

AVERAGE ANNUAL L/T

LOW HIGH

	LOW	HIGH
DAILY COINCIDENCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T	0.133	0.133

NATIONAL ANNUAL PRODUCTION(BARRELS)

0.1557E+09

FUEL ORIGIN FRACTIONS

COAL	0.0
OIL	0.360
NATURAL GAS	0.603
OTHER	0.037
OTHER	0.0

T OF SIC REPRESENTED BY PRODUCT

100.000

WPL 3 JUL 2000 MALT REV 4415

TIME FRAME: 1975.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION (BARRELS) 2036600.
 DAILY PLANT PRODUCTION (BARRELS) 5479.
 PRODUCTION DAYS PER YEAR 365.
 NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS
 UNIT ELECTRIC CONSUMPTION (KWH/BARREL) 9.0 0.0
 PEAK ELECTRICAL DEMAND (MW) 2.582 0.0
 AVERAGE ELECTRICAL DEMAND (MW) 2.065 0.0
 ELECTRICAL LOAD FACTOR (TYPICAL DAY) 0.800 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/BARREL)

WATER 140.0 0.0
 300 F STEAM 3.0.0 0.0
 400 F STEAM 5.0.0 0.0
 700 F STEAM 7.0.0 0.0
 DIRECT HEAT (LUMEN=1.00, FUEL=1.00) 420.0 0.0
 STEAM PROCESS HEAT 0.0 0.0
 BY-PRODUCT FUEL AVAILABLE (TYPE=0.00) 0.0 0.0

AVERAGE ANNUAL C/T 0.133 0.0

DAILY CORRELATION FACTOR RANGE
 SEASONAL VARIATION OF DAILY AVERAGE E/T LOW HIGH
 1.000 1.000
 0.133 0.133

NATIONAL ANNUAL PRODUCTION (BARRELS) 0.1786109

FUEL BREAKDOWN FRACTIONS
 COAL 0.0
 OIL 0.500
 NATURAL GAS 0.603
 OTHER 0.097
 OTHER 0.0

% OF SEC REPRESENTED BY PRODUCT 100.000

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NO. 1 SEC 2000 HALF BEVERAGES

TIME FRAME: 2010

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(BARRELS)
DAILY PLANT PRODUCTION(BARRELS)
PRODUCTIVE DAYS PER YEAR
TURN-PRODUCTIVE DAYS PER YEAR

200,000
5470
365
0

ELECTRICAL REQUIREMENTS

PROD NON-PROD

UNIT ELECTRICAL CONSUMPTION(KWH/BARREL)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

0.0 0.0
2.446 0.0
1.957 0.0
0.860 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/BARREL)

HOT WATER
300 F STEAM
400 F STEAM
700 F STEAM
DIRECT HEAT(CLEAN=1.00, FUEL=1.00)
USABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)

140.0
300.0
500.0
700.0
0.0
0.0
0.0

AVERAGE ANNUAL F/T

0.133 0.0

LOW HIGH

DAILY OCCURRENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE F/T

1.000 1.000
0.133 0.133

NATIONAL ANNUAL PRODUCTION(BARRELS)

0.2214E+09

FULL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER

0.063
0.286
0.560
0.097
0.0

T OF SEC REPRESENTED BY PRODUCT

100.000

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Power Systems Division

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NO. 4 510 221 KNOX MOVEN FABRIC MILLS

TIME FRAME: 1978.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

6060.
15.
312.
53.

ELECTRICAL REQUIREMENTS

PROD. HIGH-PROD.

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

1479.2 155.1
4.878 0.732
4.390 0.732
0.900 1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT(CLEAN=1.00, FUEL=1.00)
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)

140.F
370.F
338.F
700.F
400.F
0.F
0.0 0.0
0.0 0.0
17.930 0.0
0.0 0.0
1.730 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL F/T

0.951 0.0

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

LOW HIGH
1.000 1.000
0.951 0.951

NATIONAL ANNUAL PRODUCTION(TONS)

0.137E+07

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.223
0.304
0.402
0.071
0.0

% OF SEC REPRESENTED BY PRODUCT

100.000

Power Systems Division

FCR-1333

100.5 SEC 2221 ROAD WOVEN FANBEL MILLS

TIME FRAME: 1975.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)	6000.
DAILY PLANT PRODUCTION(TONS)	19.
PRODUCTIVE DAYS PER YEAR	312.
NON-PRODUCTIVE DAYS PER YEAR	53.

ELECTRICAL REQUIREMENTS	PROD	NON-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	4635.4	131.2
PEAK ELECTRICAL DEMAND(MW)	4.127	0.619
AVERAGE ELECTRICAL DEMAND(MW)	3.714	0.619
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)			
HOT WATER	140.0 F	0.0	0.0
300 F STEAM	300.0 F	0.0	0.0
500 F STEAM	358.0 F	15.169	0.0
700 F STEAM	730.0 F	0.0	0.0
DIRECT HEAT(LFAN=1.00, FUEL=1.00)	400.0 F	1.464	0.0
USABLE PROCESS HEAT	0.0 F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0)		0.0	0.0
AVERAGE ANNUAL L/T		0.951	0.0

DAILY EFFICIENCY FACTOR RANGE	LOW	HIGH
SEASONAL VARIATION OF DAILY AVERAGE E/F	1.000	1.000
	0.951	0.951

NATIONAL ANNUAL PRODUCTION(TONS)	0.1515E+07
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FUEL BREAKDOWN FRACTIONS	
COAL	0.223
OIL	0.304
NATURAL GAS	0.402
OTHER	0.071
OTHER	0.0

T OF SIC REPRESENTED BY PRODUCT	100.000
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Power Systems Division

FCR-1333

NO. 4 SIC 2021 PIPED IRON PAPER MILLS

TIME FRAME: 2000.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

6000.
15.
312.
53.

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

PROD MIN-PROD
2519.6 100.2
3.151 0.473
2.536 0.473
0.900 1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00 FUEL=1.00
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE (TYPE=J.D)

7.0 0.0 0.0
300.F 0.0 0.0
318.F 11.583 0.0
730.F 0.0 0.0
1.118 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL E/T

0.951 0.0

LOW HIGH

DAILY CORRELATION FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.951 0.951

NATIONAL ANNUAL PRODUCTION(TONS)

0.141E+07

FUEL REQUIREMENT FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.223
0.304
0.402
0.071
0.0

% OF SIC REPRESENTED BY PRODUCT

100.000

FCR-1333

TYPICAL PLANT DATA

1200.
74.
260.
105.

70004 (M-4-M)M

103.6	19.5
0.441	0.000
0.353	0.000
0.260	1.000

140. F	140. F
300. F	300. F
311. F	311. F
700. F	700. F
0. F	0. F
0. F	0. F

0.092 0.115

HIGH

1.000	1.000
260.7	260.7
6.092	6.092

0.301E+00

COAL	0.075
OIL	0.212
NATURAL GAS	0.303
OTHER	0.330
UTILITY	0.0

150-000

Power Systems Division

FCR-1333

NO. 5 SIC 2421 SAW MILLS

LINE FRAME 144.5

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION (M Btu)
12000
DAILY PLANT PRODUCTION (M Btu)
46
PRODUCTIVE DAYS PER YEAR
260
NON-PRODUCTIVE DAYS PER YEAR
105

ELECTRIC REQUIREMENTS	PROD	MIN-PROD
UNIT ELECTRIC CONSUMPTION, kWh/M Btu	157.4	15.9
PEAK ELECTRICAL DEMAND (MW)	0.380	0.076
AVERAGE ELECTRICAL DEMAND (MW)	0.304	0.076
ELECTRIC LOAD FACTOR (TYPICAL DAY)	0.803	1.000

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/M Btu)

	LOW	HIGH
HOT WATER	100.0	0.0
300 F STEAM	300.0	0.0
200 F STEAM	321.0	0.472
700 F STEAM	700.0	0.0
DIRECT HEAT (CLEAN-0.0 FUEL-0.0)	0.0	0.0
USEABLE PROCESS HEAT	0.0	0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=5.0)	15.000	0.0
AVERAGE ANNUAL E/F	0.092	0.115

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/F

	LOW	HIGH
	1.000	1.000
	0.092	0.092

NATIONAL ANNUAL PRODUCTION (M Btu)

0.437E+08

FUEL BREAKDOWN FRACTIONS

COAL	0.075
OIL	0.212
NATURAL GAS	0.383
OTHER	0.330
OTHER	0.0

T OF SIC REPRESENTED BY PRODUCT

100.000

WOL. 5 SEC 2421 SAM MILES

TIME FRAME: 20 YR.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(M NO FT)
 DAILY PLANT PRODUCTION(M NO FT)
 PRODUCTIVE DAYS PER YEAR
 NON-PRODUCTIVE DAYS PER YEAR

126.0
 46.
 260.
 102.

ELECTRIC GENERATION
 UNIT ELECTRIC CONSUMPTION(M NO FT)
 PLANT ELECTRICAL DEMAND(MW)
 AVERAGE ELECTRICAL DEMAND(MW)
 ELECTRIC LOAD FACTOR(TYPICAL DAY)

PRIM MED-PROD
 137.7 13.4
 0.331 0.066
 0.265 0.066
 0.800 1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/M NO FT)

HOT WATER
 200 F STEAM
 300 F STEAM
 700 F STEAM
 DIRECT HEAT CLEAN=0.0 FUEL=0.0
 INDIRECT PROCESS HEAT
 BY-PRODUCT FUEL AVAILABILITY(TYPE=5.0)

0.0 0.0
 0.0 0.0
 5.100 0.412
 0.0 0.0
 0.0 0.0
 0.0 0.0
 15.000 0.0

AVERAGE ANNUAL 1/1

0.092 0.115

LOW HIGH

DAILY CYCLING FACTOR RANGE
 SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
 0.052 0.092

NATIONAL ANNUAL PRODUCTION(M NO FT)

0.5510E+30

FUEL BREAKDOWN FRACTIONS

COAL
 OIL
 NATURAL GAS
 OTHER
 OTHER

0.075
 0.212
 0.303
 0.390
 0.0

T OF SEC REPRESENTED BY PRODUCT

100.000

FCR-1333

Power Systems Division

MTL 6 SEC 2021 NIMSPRING MILL

TYPE PRANS 1 1978

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTIONS(TONS) 500000
 DAILY PLANT PRODUCTIONS(TONS) 1479
 PRODUCTIVE DAYS PER YEAR 365
 NON-PRODUCTIVE DAYS PER YEAR 6

ELECTRIC REQUIREMENTS PRUD MIN-PRUD

UNIT ELECTRIC CONSUMPTION(KWH/TIM) 1741.3 0.0
 PEAK ELECTRICAL DEMAND(MW) 117.993 0.0
 AVERAGE ELECTRICAL DEMAND(MW) 167.343 0.0
 ELECTRIC LOAD FACTOR(TYPICAL DAY) 0.593 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TIM)

HOT WATER 140.6 0.643 0.0
 200 F STEAM 317.6 2.500 0.0
 500 F STEAM 371.6 5.660 0.0
 700 F STEAM 700.6 0.0 0.0
 CRUDE OIL CLEAN=1.00, FUEL=0.0 0.0 0.0 0.0
 USABLE PROCESS HEAT 0.0 0.0 0.0
 HY-PRODUCT FUEL AVAILABILITY(TYPE=4.0) 2.253 0.0
 AVERAGE ANNUAL %/ 0.675 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
 SEASONAL VARIATION OF DAILY AVERAGE L/T 0.675 0.675

NATIONAL ANNUAL PRODUCTIONS(TONS) 0.3747E+07

FUEL BREAKDOWN FRACTIONS

TOTAL 0.197
 OIL 0.385
 NATURAL GAS 0.418
 OTHER 0.0
 OTHER 0.0

% OF SEC REPRESENTED BY PRODUCT 4.800

FCR-1333

NO. 6 SIC 2621 NEAPSHUNT HILL

TIME FRAME: 1965.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

620600.
1695.
365.
0.

ELECTRIC REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

1741.3 0.0
179.733 0.0
123.246 0.0
0.953 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
200 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00, FUEL=0.0
USABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=4.0)

140.5
307.5
371.5
700.5
0.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL E/T

0.675 0.0

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.675 0.675

NATIONAL ANNUAL PRODUCTION(TONS)

0.410E+07

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.166
0.420
0.420
0.0
0.0

% OF SIC REPRESENTED BY PRODUCT

4.800

FCR-1333

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NO. 6 SIC 2221 NEWSPRINT MILL

TIME FRAME: 2000.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 726500.
DAILY PLANT PRODUCTION(TONS) 1992.
PRODUCTIVE DAYS PER YEAR 265.
NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

	PROD	NON-PROD
UNIT ELECTRICAL CONSUMPTION(KWH/TON)	1741.3	0.0
PEAK ELECTRICAL DEMAND(MW)	152.101	0.0
AVERAGE ELECTRICAL DEMAND(MW)	144.456	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.950	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	140.F	0.640
300 F STEAM	307.F	2.500
500 F STEAM	371.F	5.660
700 F STEAM	703.F	0.0
DIRECT HEAT(CLEAN=1.00,FUEL=0.0)	0.F	0.0
USEABLE PROCESS HEAT	0.F	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=4.0)	6.200	0.0
AVERAGE ANNUAL F/T	0.675	0.0

DAILY CONCURRENCE FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE F/T 0.675 0.675

NATIONAL ANNUAL PRODUCTION(TONS) 0.6291E+07

FUEL BREAKDOWN FRACTIONS

COAL	0.200
OIL	0.400
NATURAL GAS	0.400
OTHER	0.0
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT 4.800

FCR-1333

TIME PERIOD 1973.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 140000
 DAILY PLANT PRODUCTION(TONS) 493
 PRODUCTIVE DAYS PER YEAR 365
 NON-PRODUCTIVE DAYS PER YEAR 0

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	1227.1	0.0
PLAK ELECTRICAL DEMAND(MW)	28.705	0.0
AVERAGE ELECTRICAL DEMAND(MW)	27.270	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAYS)	0.950	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

100 F WATER	140.0	0.0
200 F STEAM	307.0	0.0
300 F STEAM	307.0	0.0
700 F STEAM	700.0	0.0
DIRECT HEAT(CAN=1.00, FUEL=0.0)	0.0	0.0
USEABLE PROCESS HEAT	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYP=4.0)	15.400	0.0
AVERAGE ANNUAL E/T	0.221	0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T	0.221	0.221

NATIONAL ANNUAL PRODUCTION(TONS) 0.3167E+07

FUEL BREAKDOWN FRACTIONS

COAL	0.278
OIL	0.410
NATURAL GAS	0.282
OTHER	0.0
Other	0.0

T OF SIC REPRESENTED BY PRODUCT

9.100

FCR-1333

TIME FRAME: 19-5.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

207000.
567.
365.
0.

ELECTRIC REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

127.1 0.0
33.011 0.0
31.361 0.0
6.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
600 F STEAM
700 F STEAM
DIRECT HEAT(CLEAN=1.00, FUEL=0.0)
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)

140.F 0.0
367.F 0.0
371.F 0.0
700.F 0.0
0.0 0.0
0.0 0.0
15.500 0.0

AVERAGE ANNUAL E/T

0.221 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.221 0.221

NATIONAL ANNUAL PRODUCTION(TONS)

0.320 X 10⁷

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.262
0.456
0.262
0.0
0.0

% OF STEAM REPRESENTED BY PRODUCT

8.100

FCR-1333

TIME FRAME: 2000

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
DOWN-PRODUCTIVE DAYS PER YEAR

242 300
664
365
0

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LIQUID FACTOR(TYPICAL DAY)

1327.1 0.0
38.641 0.0
36.709 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
700 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00 FUEL=0.0
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=4.0)

140.0
307.0
321.0
730.0
0.0
0.0
15.400

AVERAGE ANNUAL F/T

0.221 0.0

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

LOW HIGH
1.000 1.000
0.221 0.221

NATIONAL ANNUAL PRODUCTION(TONS)

0.486(E+07)

FUEL REQUIREMENTS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.305
0.413
0.282
0.0
0.0

T OF SIC REPRESENTED BY PRODUCT

8.100

Power Systems Division

FCR-1333

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TIME FRAME: 1975

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

675,000
1849
365
0

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

878.7 0.0
71.276 0.0
63.712 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

INT WATER
700 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN-1.00, FUEL=0.0
USABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYP)=4.01

140.6 0.0
367.6 0.0
371.6 0.0
723.6 0.0
0.0 0.0
0.0 0.0
14,500 0.0

AVERAGE ANNUAL E/T

0.142 0.0

DAILY CORRECTION FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

LIM HIGH
1.000 1.000
0.142 0.142

NATIONAL ANNUAL PRODUCTION(TONS)

0.106 M+0M

FUEL MIXTURE FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER 4

0.220
0.297
0.493
0.0
0.0

% OF SEC REPRESENTED BY PRODUCT

38.500

FCR-1333

NO. 8 SIC 2031 CLIMATED PAPER MILL

TIME FRAME: 1965.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
 DAILY PLANT PRODUCTION(TONS)
 PRODUCTIVE DAYS PER YEAR
 NON-PRODUCTIVE DAYS PER YEAR

775000
 2125
 365
 0

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)

678.7 0.0

PEAK ELECTRICAL DEMAND(MW)

91.899 0.0

AVERAGE ELECTRICAL DEMAND(MW)

77.803 0.0

ELECTRIC LOAD FACTOR(TYPICAL DAY)

0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 120°F 1.520 0.0

200°F STEAM 307°F 9.370 0.0

500°F STEAM 371°F 10.210 0.0

700°F STEAM 700°F 0.0 0.0

DIRECT HEAT CLEAN=1.00, FUEL=0.0 0.0 0.0

INDIRECT HEAT PROCESS HEAT 0.0 0.0 0.0

BY-PRODUCT FUEL AVAILABLE(TYPICAL TYPE=4.0)

14.500 0.0

AVERAGE ANNUAL F/I

0.142 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE

1.000 1.000

SEASONAL VARIATION OF DAILY AVERAGE E/I

0.142 0.142

NATIONAL ANNUAL PRODUCTION(TONS)

0.1845E+08

FUEL BREAKDOWN FRACTIONS

COAL

0.192

OIL

0.327

NATURAL GAS

0.481

OTHER

0.0

OTHER 2

0.0

% OF SIC REPRESENTED BY PRODUCT

38.566

NO. 1 SIC 204 CIRCULATED PAPER MILL

TIME FRAME: 20 YR

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

500000
2430
365
0

ELECTRICAL REQUIREMENTS

PROD MIN-PRIM

UNIT ELECTRICAL CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

678.7 0.0
95.942 0.0
91.145 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
100 F STEAM
200 F STEAM
300 F STEAM
DIRECT HEAT(FAN=1.00, FUEL=0.0)
USEFUL PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=4.0)

140.6
307.6
371.6
760.6
0.0
0.0
14.500 0.0

AVERAGE ANNUAL E/T

0.142 0.0

LOW HIGH

DAILY CORRELANCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.142 0.142

NATIONAL ANNUAL PRODUCTION(TONS)

0.252 JE+09

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER

0.216
0.314
0.470
0.0
0.0

% OF SIC REPRESENTED BY PRODUCT

10.500

FCR-1333

Power Systems Division

FCR-1333

NO. 4 SEC 26.11 FOR MIAWJ MILL
 TIME FRAME: 1974.
 TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(MT/TONS)
 DAILY PLANT PRODUCTION(MT/TONS)
 PRODUCTION DAYS PER YEAR
 MIN-PRODUCTION DAYS PER YEAR

ELECTRIC REQUIREMENTS
 UNIT ELECTRIC CONSUMPTION(MT/TON)
 YEAR ELECTRIC DEMAND(MT)
 AVERAGE ELECTRIC DEMAND(MT)
 ELECTRIC LOAD FACTOR(TYPICAL DAY)

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
 100 F STEAM
 500 F STEAM
 700 F STEAM
 DIRECT HEAT CLEAN=1.00, FUEL=0.0
 USABLE PROCESS HEAT
 BY-PRODUCT FUEL AVAILABLE(TYPICAL)
 AVERAGE ANNUAL T/T

DAILY CONCURRENCE FACTOR RANGE
 SEASONAL VARIATION OF DAILY AVERAGE E/T
 LOW HIGH

NATIONAL ANNUAL PRODUCTION(TONS)

FUEL BREAKDOWN FRACTIONS
 COAL
 OIL
 NATURAL GAS
 OTHER
 OTHER

T OF SEC REPRESENTED BY PRODUCT

WILSON SIC 20-1 BOX BOARD MILL

TIME FRAME: 1945

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 517000
 DAILY PLANT PRODUCTION(TONS) 1416
 PRODUCTIVE DAYS PER YEAR 365
 NON-PRODUCTIVE DAYS PER YEAR 0

ELECTRICAL REQUIREMENTS

UNIT ELECTRICAL CONSUMPTION(KWH/TON) 1021.0 0.0
 PEAK ELECTRICAL DEMAND(MW) 82.642 0.0
 AVERAGE ELECTRICAL DEMAND(MW) 66.159 0.0
 ELECTRIC LOAD FACTOR(TYPICAL DAY) 0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 120.0 1.760 0.0
 300 F STEAM 307.5 4.550 0.0
 200 F STEAM 371.5 12.790 0.0
 700 F STEAM 710.0 0.0 0.0
 DIRECT HEAT CLEAN-1.00, FUEL=0.0 0.0 0.0
 USABLE PROCESS HEAT 0.0 0.0 0.0
 BY-PRODUCT FUEL AVAILANCE (TYPE=4.1) 19.700 0.0

AVERAGE ANNUAL L/T 0.159 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE 1.000 1.000
 SEASONAL VARIATION OF DAILY AVERAGE L/T 0.159 0.159

NATIONAL ANNUAL PRODUCTION(TONS)

0.4861E+07

FUEL BREAKDOWN FRACTIONS

COAL 0.147
 OIL 0.241
 NATURAL GAS 0.477
 OTHER 0.0
 OTHER 0.0

% OF SIC REPRESENTED BY PRODUCT

8.400

FCR-1333

Power Systems Division

FCR-1333

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ML 4 SIC 267 CAR GUARD MILL

TIME FRAME: 2011

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION (TONS)
DAILY PLANT PRODUCTION (TONS)
PRODUCTIVE DAYS PER YEAR
DOWN-PRODUCTIVE DAYS PER YEAR

947000
1436
365
0

ELECTRICAL REQUIREMENTS

MIN-MAX-PRD

UNIT ELECTRICAL CONSUMPTION (KWH/TON)
PEAK ELECTRICAL DEMAND (MW)
AVERAGE ELECTRICAL DEMAND (MW)
ELECTRIC LOAD FACTOR (TYPICAL DAY)

1121.0 0.0
80.618 0.0
76.347 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

HOT WATER
700 F STEAM
700 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00, FUEL=0.0
INFANTRY PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE (TYPE 3.0)

140.0
1.760 0.0
9.550 0.0
12.790 0.0
0.0 0.0
0.0 0.0
0.0 0.0
15.760 0.0

AVERAGE ANNUAL E/F

0.159 0.0

LOW HIGH

DAILY CONCURRENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/F

1.000 1.000
0.159 0.159

NATIONAL ANNUAL PRODUCTION (TMS)

0.7567607

FUEL BREAKDOWN FRACTIONS

COAL
GIL
NATURAL GAS
OTHER

0.209
0.326
0.465
0.0
0.0

T OF SIC REPRESENTED BY PRODUCT

0.400

NO. 11, SIC 2812 (MILWIP/CAUSTIC PROD-HEAT)

TIME FRAME: 1970.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(MT)
DAILY PLANT PRODUCTION(MT)
PRODUCTIVE DAYS PER YEAR
MIN-PRODUCTIVE DAYS PER YEAR

150000.
411.
365.
0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRICAL CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

4000 MIN-PROD
3357.0 0.0
60.500 0.0
57.483 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
200 F STEAM
700 F STEAM
DIRECT HEAT LEAKAGE FUEL=0.0
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)
AVERAGE ANNUAL FUEL

140.0 F
274.0 F
312.0 F
700.0 F
0.0
0.0
2.900 0.0
1.032 0.0

DAILY CONCURRENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/F

LOW HIGH
1.000 1.000
1.032 1.032

NATIONAL ANNUAL CRUDE RIMS(TONS)

0.110000

FUEL REQUIREMENT FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.400
0.040
0.400
0.0
0.0

% OF SIC REPRESENTED BY PRODUCT

85.200

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Power Systems Division

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NO. 10 ALL PIP LINES/CAUSTIC PIPING

TIME FRAME: 10 %

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTIONS
DAILY PLANT PRODUCTIONS
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

1,000,000
603
365
0

ELECTRICAL REQUIREMENTS

PPH MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

2919.7 0.0
77.186 0.0
75.377 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

100 F WATER
100 F STEAM
500 F STEAM
TOP F STEAM
DIRECT HEAT EXCHANGER
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)

140.0 0.0
274.0 0.0
312.0 0.0
760.0 0.0
0.0 0.0
0.0 0.0
2.900 0.0

AVERAGE ANNUAL E/T

1.032 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
1.032 1.032

NATIONAL ANNUAL CRUDE PRODUCTIONS

0.1441E+08

FUEL REFINERY FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.570
0.020
0.410
0.0
0.0

T OF SIC REPRESENTED BY PRODUCT

55.200

NO. 10 SIC 2812 CHLORINE/CAUSTIC PRODUCTION

TIME FRAME: 2010.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 365000;
DAILY PLANT PRODUCTION(TONS) 1000;
PRODUCTIVE DAYS PER YEAR 365;
NON-PRODUCTIVE DAYS PER YEAR 0;

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT (ELECTRIC CONSUMPTION(KWH/TON))	2450.3	0.0
PEAK ELECTRICAL DEMAND(MW)	107.470	0.0
AVERAGE ELECTRICAL DEMAND(MW)	102.096	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.950	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	140.0	0.0
300 F STEAM	274.0	0.0
500 F STEAM	322.0	0.0
700 F STEAM	700.0	0.0
DIRECT HEAT(CLEAN=1.00,FUEL=0.0)	0.0	0.0
USEABLE PROCESS HEAT	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)	2.900	0.0
AVERAGE ANNUAL F/T	1.033	0.0

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T 1.033 1.033

NATIONAL ANNUAL CRUDE RUNS(TONS) 0.216E+08

FUEL BREAKDOWN FRACTIONS

COAL	0.670
OIL	0.330
NATURAL GAS	0.0
OTHER	0.0
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT 85.200

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NO. 11 SIC 2819 ALUMINA

TIME FRAME: 1978.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
MIN-PRODUCTIVE DAYS PER YEAR

130000
2329
365
0

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

275.0 0.0
29.648 0.0
26.643 0.0
0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
700 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT(CELL=2.00, FUEL=2.00)
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABILITY(TYPE=0.0)

140.0
300.0
422.0
730.0
2100.0
860.0
1400.0
0.0

AVERAGE ANNUAL E/T

0.104 0.0

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.104 0.104

NATIONAL ANNUAL PRODUCTION(TONS)

0.6971307

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER

0.0
0.0
1.000
0.0

% OF SIC REPRESENTED BY PRODUCT

18.500

FCR-1333

NO.11 SIC 2410 ALUMINA

TIME FRAME: 1975.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 400600.
DAILY PLANT PRODUCTION(TONS) 2466.
PRODUCTIVE DAYS PER YEAR 365.
MIN-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

	PROD	MIN	PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	270.0	0.0	
PEAK ELECTRICAL DEMAND(MW)	30.872	0.0	
AVERAGE ELECTRICAL DEMAND(MW)	27.740	0.0	
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.960	0.0	

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	6.0	0.0
300 F STEAM	0.0	0.0
400 F STEAM	4.800	0.0
700 F STEAM	0.0	0.0
DIRECT HEAT CLEAN 2.00 FUEL 2.00	3.350	0.0
USEFUL PROCESS HEAT	1.400	0.0
BY-PRODUCT FUEL AVAILABLE(TYP=0.0)	0.0	0.0
AVERAGE ANNUAL F/T	0.113	0.0

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

	LOW	HIGH
	1.000	1.000
	0.113	0.113

NATIONAL ANNUAL PRODUCTION(TONS)

0.470E+07

FUEL BREAKDOWN FRACTIONS

COAL	0.0
OIL	0.390
NATURAL GAS	0.610
OTHER	0.0
OTHER	0.0

* OF SIC REPRESENTED BY PRODUCT

18.500

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NO. 11 SIC 2114 ALUMINA

TIME FRAME: 2010.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

10000.00
2740.
365.
0.

ELECTRICAL REQUIREMENTS

PROD MIN-PRIND

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

270.0 0.0
34.247 0.0
10.822 0.0
0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 140.0 F
300 F STEAM 330.0 F
500 F STEAM 422.0 F
700 F STEAM 700.0 F
DIRECT HEATING CLEAN=2.00, FUEL=2.00 2100.0 F
USEABLE PROCESS HEAT 800.0 F
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)

0.0 0.0
0.0 0.0
4.800 0.0
6.0 0.0
3.070 0.0
1.400 0.0
0.0 0.0

AVERAGE ANNUAL E/T

0.117 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.117 0.117

NATIONAL ANNUAL PRODUCTION(TONS)

0.125E+08

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.0
0.670
0.330
0.0
0.0

T OF SIC REPRESENTED BY PRODUCT

10.500

NO. 12 SIC 2621 LOW DENSITY POLYETHYLENE

TIME FRAME: 1979.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 190000.
DAILY PLANT PRODUCTION(TONS) 521.
PRODUCTIVE DAYS PER YEAR 265.
NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS	PROD	NON-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	2206.0	0.0
PLANT ELECTRICAL DEMAND(MW)	50.365	0.0
AVERAGE ELECTRICAL DEMAND(MW)	47.647	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.950	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	0.0	0.0
200 F STEAM	0.420	0.0
300 F STEAM	3.050	0.0
700 F STEAM	0.0	0.0
DIRECT HEAT CLEAN=1.00, FUEL=0.0	0.0	0.0
USFABLE PROCESS HEAT	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0
AVERAGE ANNUAL E/T	2.170	0.0

DAILY CLINGING FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T 2.170 2.170

NATIONAL ANNUAL PRODUCTION(TONS) 0.345(E+07)

FUEL BREAKDOWN FRACTIONS

COAL	0.200
OIL	0.180
NATURAL GAS	0.520
OTHER	0.100
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT 17.330

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Power Systems Division

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NO. 12 SIC 2821 LOW DENSITY POLYETHYLENE

TIME FRAME: 1965.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 150,000.
DAILY PLANT PRODUCTION(TONS) 521.
PRODUCTIVE DAYS PER YEAR 365.
NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON) 1743.0 0.0
PEAK ELECTRICAL DEMAND(MW) 39.245 0.0
AVERAGE ELECTRICAL DEMAND(MW) 17.805 0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY) 0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 140.0 0.0
200 F STEAM 306.0 0.0
500 F STEAM 566.0 0.0
700 F STEAM 700.0 0.0
DIRECT HEAT CLEAN=1.00, FUEL=0.0 0.0 0.0
USABLE PROCESS HEAT 0.0 0.0
BY-PRODUCT FUEL AVAILABLE(TYP=0.0) 0.0 0.0
AVERAGE ANNUAL E/T 2.170 0.0

LUM HIGH

DAILY COINCIDING FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T 2.170 2.170

NATIONAL ANNUAL PRODUCTION(TONS) 0.5945E+07

FUEL BREAKDOWN FRACTIONS

COAL 0.200
OIL 0.180
NATURAL GAS 0.570
OTHER 0.100
OTHER 0.0

% OF SIC REPRESENTED BY PRODUCT

17.170

FIG. 12 SIC 2821 LOW DENSITY POLYETHYLENE

TIME FRAME: 2000.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION (TONS) 190000.
DAILY PLANT PRODUCTION (TONS) 521.
PRODUCTIVE DAYS PER YEAR 365.
NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION (KWH/TON) 1260.0 0.0
PEAK ELECTRICAL DEMAND (MW) 29.274 0.0
AVERAGE ELECTRICAL DEMAND (MW) 27.763 0.0
ELECTRIC LOAD FACTOR (TYPICAL DAY) 0.450 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

HOT WATER 140.0 0.0
300 F STEAM 0.244 0.0
500 F STEAM 1.769 0.0
700 F STEAM 0.0 0.0
DIRECT HEAT (CLEAN) 1.00, FUEL 0.0 0.0
USEABLE PROCESS HEAT 0.0 0.0
BY-PRODUCT FUEL AVAILABLE (TYPE 0.0) 0.0 0.0
AVERAGE ANNUAL L/T 2.171 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE L/T 2.171 2.171

NATIONAL ANNUAL PRODUCTION (TONS) 0.14321+08

FUEL BREAKDOWN FRACTIONS

COAL 0.200
OIL 0.180
NATURAL GAS 0.520
OTHER 0.100
0.0

T OF SIC REPRESENTED BY PRODUCT 17.330

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NO. 13 SIC 2821 HIGH DENSITY POLY. MATH

TIME FRAME: 1975.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

140000.
384.
365.
0.

ELECTRICAL REQUIREMENTS

KWH M31-PHCH

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

1550.0 0.0
26.176 0.0
26.067 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 140.0
300 F STEAM 350.0
500 F STEAM 500.0
700 F STEAM 700.0
DIRECT HEAT (FAN=1.00, FUEL=0.0)
USEABLE PROCESS HEAT 0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=C.G.) 0.0
AVERAGE ANNUAL 1/T 0.0

LOW HIGH

DAILY CHURNING FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.060
0.850 0.890

NATIONAL ANNUAL PRODUCTION(TONS)

0.205E+07

FUEL REQUIREMENT FRACTIONS

COAL 0.200
OIL 0.180
NATURAL GAS 0.520
OTHER 0.100
OTHER 0.0

Z OF SIC REPRESENTED BY PRODUCT

9.640

Power Systems Division

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W1.17 SIC 2821 HIGH DENSITY POLYMER REFINERY

TIME PERIOD: 1955

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

140000
324
365
0

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

1210.0 0.0
26.356 0.0
19.336 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN-1.00, FUEL=0.0
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=0.1)

140.0 0.0
300.0 0.0
500.0 0.0
700.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL E/T

0.879 0.0

LOW HIGH

DAILY CONCURRENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.879 0.879

NATIONAL ANNUAL PRODUCTION(TONS)

0.3255E+07

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.200
0.180
0.520
0.100
0.0

% OF SIC REPRESENTED BY PRODUCT

9.640

Power Systems Division

FCR-1333

N.1.13 SIC 2821 HIGH DENSITY POLY BAYONE

TIME FRAME: 2010.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
WOM-PRODUCTIVE DAYS PER YEAR

140000.
384.
345.
0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRICAL CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LINES FACILITIES(TYPICAL DAY)

PROD NCM-PMOD
825.0 0.0
14.552 0.0
13.824 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00, FUEL=0.0
USABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABILITY(TYPICAL)

140.0
300.0
500.0
700.0
0.0
0.0
0.0

AVERAGE ANNUAL L/T

0.000 0.0

LOW HIGH

DAILY CORRELATION FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE C/T

1.000 1.000
0.000 0.000

NATIONAL ANNUAL PRODUCTION(TONS)

0.716E237

FUEL REQUIREMENT FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.200
0.180
0.520
0.100
0.0

T OF SIC REPRESENTED BY PRODUCT

9.640

NO. 14 SEC 2421 POLYVINYL CHLORIDE

TIME FRAME: 1970

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 120000
 DAILY PLANT PRODUCTION(TONS) 329
 PRODUCTIVE DAYS PER YEAR 365
 NON-PRODUCTIVE DAYS PER YEAR 0

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT ELECTRICAL CONSUMPTION(KWH/TON)	1652.0	0.0
PEAK ELECTRICAL DEMAND(MW)	15.169	0.0
AVERAGE ELECTRICAL DEMAND(MW)	14.411	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.950	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER	140.0 F	0.0	0.0
300 F STEAM	300.0 F	0.0	0.0
500 F STEAM	500.0 F	5.400	0.0
700 F STEAM	700.0 F	0.0	0.0
DIRECT HEAT CLEAN=1.00, FUEL=0.0	0.0 F	0.0	0.0
USEABLE PROCESS HEAT	0.0 F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPICAL TYPE=J.G.)	0.0	0.0	0.0
AVERAGE ANNUAL E/T		0.675	0.0

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DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
 SEASONAL VARIATION OF DAILY AVERAGE E/T 0.665 0.665

NATIONAL ANNUAL PRODUCTION(TONS) 0.2875607

FUEL REQUIREMENT FRACTIONS

COAL	0.200
OIL	0.190
NATURAL GAS	0.520
OTHER	0.100
	0.0

T OF SEC REPRESENTED BY PRODUCT 11.540

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Power Systems Division

FCR-1333

NO. 14 SIC 7201 MINING AND QUARRYING

TIME FRAME: 1975

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION (TONS)
DAILY PLANT PRODUCTION (TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

120,000
326
365
0

ELECTRICAL REQUIREMENTS

PHNU MIN-PRIO

UNIT ELECTRICAL CONSUMPTION (KWH/TON)
PEAK ELECTRICAL DEMAND (MW)
AVERAGE ELECTRICAL DEMAND (MW)
ELECTRIC LIFU FACTOR (TYPICAL DAY)

947.0 0.0
13.655 0.0
12.973 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

HOT WATER
200 F STEAM
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT (CLEAN) (NO FUEL) (0.0)
USEFUL HEAT (CLEAN) (NO FUEL) (0.0)
BY-PRODUCT FUEL AVAILABLE (TYPE) (0.0)

140.0 0.0 0.0
300.0 0.0 0.0
500.0 0.0 0.0
700.0 0.0 0.0
0.0 0.0 0.0
0.0 0.0 0.0
0.0 0.0 0.0

AVERAGE ANNUAL 5/1

0.665 0.0

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE 5/1

1.000 1.000
1.000 0.665

NATIONAL ANNUAL PRODUCTION (TONS)

0.51135707

FUEL REQUIREMENT FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
UNKN

0.200
0.100
0.520
0.100
0.0

T OF SIC REPRESENTED BY PRODUCT

11.540

WD-14 SIC (P) POLYVINYL CHLORIDE

LINE FRAME 20.0

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION (TONS)
DAILY PLANT PRODUCTION (TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

170000
320
365
0

ELECTRIC REQUIREMENTS

PROD. MIN-PHYS

UNIT ELECTRIC CONSUMPTION (KWH/TON)
PLANT ELECTRICAL DEMAND (MW)
AVERAGE ELECTRICAL DEMAND (MW)
ELECTRIC LOAD FACTOR (TYPICAL DAY)

842.0 0.0
17.141 0.0
11.534 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT (CLEAN-1.00, FUEL-0.0)
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE (TYPE=U.O)

1.0 0.0
3.0 0.0
5.0 0.0
7.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL I/F

0.665 0.0

DAILY CONCURRENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/I

1.000 1.000
0.665 0.665

NATIONAL ANNUAL PRODUCTION (TONS)

0.1221E+06

FUEL REQUIREMENT FRACTIONS

COAL
OIL
NATURAL GAS
Other

0.200
0.100
0.520
0.100
0.0

T OF SIC REPRESENTED BY PRODUCT

11.540

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OF POOR QUALITY

WILKINSON STEEL COMPANY - MILL AND ROLLING

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION (TONS) 126,600
DAILY PLANT PRODUCTION (TONS) 351
PRODUCTIVE DAYS PER YEAR 365
WEEK-PRODUCED TONS PER YEAR 62

ELECTRICAL REQUIREMENTS
UNIT ELECTRICAL CONSUMPTION (KWH/TON) 210.1 0.0
PEAK ELECTRICAL DEMAND (MW) 3.448 0.0
AVERAGE ELECTRICAL DEMAND (MW) 3.157 0.0
ELECTRIC LUMP FACTOR (TYPICAL DAYS) 1.000 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

HOT WATER 300.0 0.0
100% F STEAM 262.0 0.0
50% F STEAM 378.0 0.0
70% F STEAM 720.0 0.0
DIRECT HEAT (LUMP) 2.00 20.00 0.0
USEABLE PROCESS HEAT 0.0 0.0 0.0
BY-PRODUCT FUEL AVAILABLE (TYP) 2.00 0.0 0.0

AVERAGE ANNUAL T/T 0.101 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE T/T 0.000 0.000

NATIONAL ANNUAL PRODUCTION (TONS) 0.105 2.07

FUEL BREAKDOWN FRACTIONS
COAL 0.005
OIL 0.005
NATURAL GAS 0.000
OTHER 0.170
OTHER 0.0

T OF STEEL REPRESENTED BY PRODUCT 19.300

TIME FRAME: 1965.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 125000.
 DAILY PLANT PRODUCTION(TONS) 351.
 PRODUCTIVE DAYS PER YEAR 365.
 NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON) 165.4 0.0
 PEAK ELECTRICAL DEMAND(MW) 2.931 0.0
 AVERAGE ELECTRICAL DEMAND(MW) 2.709 0.0
 ELECTRIC LOAD FACTOR(TYPICAL DAY) 1.000 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 140.F 0.0 0.0
 300 F STEAM 247.F 1.284 0.0
 500 F STEAM 371.F 3.463 0.0
 700 F STEAM 700.F 0.0 0.0
 DIRECT HEAT CLEAN=2.00, FUEL=2.00 2000.F 1.555 0.0
 USEABLE PROCESS HEAT 0.0 0.0 0.0
 BY-PRODUCT FUEL AVAILABLE(TYPE=0.0) 0.0 0.0 0.0

AVERAGE ANNUAL F/T 0.101 0.0

LOW HIGH

DAILY COINCIDENT FACTOR RANGE 1.000 1.000
 SEASONAL VARIATION OF DAILY AVERAGE F/T 0.096 0.115

NATIONAL ANNUAL PRODUCTION(TONS) 0.1855E+07

FUEL BREAKDOWN FRACTIONS

COAL 0.085
 OIL 0.056
 NATURAL GAS 0.688
 OTHER 0.171
 OTHER 0.0

% OF SIC REPRESENTED BY PRODUCT 39.300

Power Systems Division

FCR-1333

NO. 15 SIC 2422 STEAM-BOILER NUMBER

TIME FRAME: 2000.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

128000.
351.
365.
0.

ELECTRICAL REQUIREMENTS

PROD NON-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

152.7 0.0
2.414 0.0
2.231 0.0
1.000 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT(CLIAN=2.00,FUEL=2.00)
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)

140.F
267.F
371.F
770.F
2000.F
0.F
0.0
0.0
0.0

AVERAGE ANNUAL F/T

0.101 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE F/T

1.000 1.000
0.086 0.115

NATIONAL ANNUAL PRODUCTION(TONS)

0.261E+07

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.095
0.056
0.688
0.171
0.0

T OF SIC REPRESENTED BY PRODUCT

39.300

NO. 16 STC 2874 NYLIN

TIME FRAME: 1978

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 57000
 DAILY PLANT PRODUCTION(TONS) 156
 PRODUCTIVE DAYS PER YEAR 365
 NON-PRODUCTIVE DAYS PER YEAR 0

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	1223.6	0.0
PEAK ELECTRICAL DEMAND(MW)	5.914	0.0
AVERAGE ELECTRICAL DEMAND(MW)	4.914	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	1.000	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER	140.F	0.0	0.0
300 F STEAM	300.F	0.520	0.0
500 F STEAM	470.F	3.241	0.0
700 F STEAM	532.F	1.746	0.0
DIRECT HEAT(CLEAN=2.00, FUEL=0.0)	0.F	0.0	0.0
USEABLE PROCESS HEAT	0.F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0	0.0
AVERAGE ANNUAL E/T	0.944	0.0	

	LOW	HIGH
DAILY OCCURRENCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T	0.944	0.944

NATIONAL ANNUAL PRODUCTION(TONS) 0.9365E+06

FUEL BREAKDOWN FRACTIONS

COAL	0.347
OIL	0.417
NATURAL GAS	0.091
OTHER	0.046
OTHER	0.0

% OF STC REPRESENTED BY PRODUCT 70.000

FCR-1333

TIME FRAME: 1975.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 57000.
 DAILY PLANT PRODUCTION(TONS) 156.
 PRODUCTIVE DAYS PER YEAR 365.
 NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT ELECTRICAL CONSUMPTION(KWH/TON)	1263.1	0.0
PEAK ELECTRICAL DEMAND(MW)	8.219	0.0
AVERAGE ELECTRICAL DEMAND(MW)	8.219	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	1.000	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER	140.F	0.0	0.0
300 F STEAM	300.F	0.431	0.0
500 F STEAM	470.F	2.692	0.0
700 F STEAM	532.F	1.447	0.0
DIRECT HEAT CLEAN=2.00, FUEL=0.0)	0.F	0.0	0.0
USABLE PROCESS HEAT	0.F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0)	0.0	0.0	0.0

AVERAGE ANNUAL E/T

0.943 0.0

LOW HIGH

DAILY CORRELATION FACTOR RANGE
 SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
 0.943 0.943

NATIONAL ANNUAL PRODUCTION(TONS)

0.120E+07

FUEL BREAKDOWN FRACTIONS

COAL	0.347
OIL	0.417
NATURAL GAS	0.191
OTHER	0.046
OTHER	0.0

T OF SIC REPRESENTED BY PRODUCT

70.000

FCR-1333

NO. 10 SIC 2824 NYLON

TIME FRAME: 20 Y.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 57000.
 DAILY PLANT PRODUCTION(TONS) 156.
 PRODUCTIVE DAYS PER YEAR 365.
 NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

	PROD	NON-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	1004.0	0.0
PEAK ELECTRICAL DEMAND(MW)	6.533	0.0
AVERAGE ELECTRICAL DEMAND(MW)	6.533	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	1.000	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	140.F	0.0
300 F STEAM	300.F	0.0
500 F STEAM	470.F	0.0
700 F STEAM	532.F	0.0
DIRECT HEAT CLEAN=2.00, FUEL=0.0	0.0	0.0
HEATABLE PROCESS HEAT	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0
AVERAGE ANNUAL F/T	0.943	0.0

DAILY COINCIDENCE FACTOR RANGE 1.010 1.000
 SEASONAL VARIATION OF DAILY AVERAGE E/T 0.943 0.943

NATIONAL ANNUAL PRODUCTION(TONS)

0.2495E+07

FUEL BREAKDOWN FRACTIONS

COAL	0.347
OIL	0.417
NATURAL GAS	0.191
OTHER	0.046
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT

70.000

FCR-1333

TIME FRAME: 1974.

Power Systems Division

FCR-1333

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTIONS)	500000.
DAILY PLANT PRODUCTIONS)	1370.
PRODUCTIVE DAYS PER YEAR	365.
NON-PRODUCTIVE DAYS PER YEAR	0.

ELECTRICAL REQUIREMENTS		PROD	MINI-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)		75.4	0.0
PEAK ELECTRICAL DEMAND(MW)		4.813	0.0
AVERAGE ELECTRICAL DEMAND(MW)		4.331	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)		0.900	0.0

AVERAGE THERMAL PICKUP: 15 MILLION BTU/TON

HOT WATER		140.F	0.0	0.0
300 F STEAM		300.F	29.280	0.0
500 F STEAM		500.F	N.O.	0.0
700 F STEAM		700.F	O.O.	0.0
DIRECT HEAT CLEAN=1.00)		1400.F	4.900	0.0
USABLE PROCESS HEAT		500.F	0.720	0.0
CY-PRIMUM FUEL AVAILABLE (TYPE=1.1)			2.900	0.0

AVE RATE- ANNUAL I/Y	
0.00H	0.0

	LOW	HIGH
DAILY COINCIDENCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T	0.008	0.008

NATIONAL ANIMAL PRODUCTION (TONS)

FUEL BREAKDOWN PERCENTS	
COAL	0.08
OIL	0.236
NATURAL GAS	0.632
OTHER	0.049
UNFUEL	0.0

% OF SIC REPRESENTED BY PRODUCT

TIME FRAME: 1975

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS)
 DAILY PLANT PRODUCTION(TONS)
 PRODUCTIVE DAYS PER YEAR
 NON-PRODUCTIVE DAYS PER YEAR

5000.00
 1370.
 265.
 0.

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
 PEAK ELECTRICAL DEMAND(MW)
 AVERAGE ELECTRICAL DEMAND(MW)
 ELECTRIC LOAD FACTOR(TYPICAL DAY)

68.3 0.0
 4.331 0.0
 3.999 0.0
 0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
 200 F STEAM
 500 F STEAM
 700 F STEAM
 DIRECT HEAT(CLEAN=1.00, FUEL=1.00)
 USABLE PROCESS HEAT
 BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)

140.F
 300.F
 500.F
 700.F
 1400.F
 500.F
 2.900 0.0

AVERAGE ANNUAL C/T

0.006 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE
 SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
 0.000 0.000

NATIONAL ANNUAL PRODUCTION(TONS)

0.519UE+07

FUEL BREAKDOWN FRACTIONS

COAL
 OIL
 NATURAL GAS
 OTHER

0.703
 0.236
 0.632
 0.049
 0.0

% OF SIC REPRESENTED BY PRODUCT

54.300

FCR-1333

NP-17 SIC 265 SYHEM

TIME FRAME: 2000

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

500,000
1370
365
0

ELECTRICAL EQUIPMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

PROD MIN-PROD
43.7 0.0
5.310 0.0
4.779 0.0
0.400 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00 FUEL=1.00
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)

LOW HIGH
140.0 0.0
300.0 21.834 0.0
500.0 0.0 0.0
700.0 0.0 0.0
1400.0 4.390 0.0
500.0 0.720 0.0
2.900 0.0

AVERAGE ANNUAL L/T

0.011 0.0

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

LOW HIGH
1.000 1.000
0.011 0.011

NATIONAL ANNUAL PRODUCTION(TONS)

0.80000007

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
UNL

0.003
0.236
0.632
0.049
0.0

T OF SIC REPRESENTED BY PRODUCT

54.300

FCR-1333

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Power Systems Division

FCR-1333

MO. IN SIC 2800 (TAYLOR ENGINE PLANT)
TINE FRAME: 1970.
TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

455000.
1356.
365.
0.

ELECTRICAL REQUIREMENTS

PROD NON-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

39.4 0.0
7.371 0.0
2.252 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00, FUEL=0.0
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)

140.F
300.F
500.F
850.F
2010.F
0.F
27.480 0.0

AVERAGE ANNUAL E/T

0.002 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.002 0.002

NATIONAL ANNUAL PRODUCTION(TONS)

0.131E+08

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER

0.051
0.092
0.900
0.957
0.0

T OF SIC REPRESENTED BY PRODUCT

26.000

NO. 10 SEC 2500 (HYDRO THERMAL PLANT)

TIME FRAME: 1975.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION (TONS)
DAILY PLANT PRODUCTION (TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

2500.
175.
365.
0.

ELECTRIC REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION (KWH/TON)
PEAK ELECTRICAL DEMAND (MW)
AVERAGE ELECTRICAL DEMAND (MW)
ELECTRIC LOAD FACTOR (TYPICAL DAY)

36.3 0.0
2.845 0.0
2.703 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

NET WATER
700 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=1.00, FUEL=0.0
USABLE PROCESS HEAT
HY-PREDICT FUEL AVAILABLE (TYPE=1.3)

140.F 0.0 0.0
350.F 0.0 0.0
500.F 0.0 0.0
850.F 6.840 0.0
2000.F 50.020 0.0
0.F 0.0 0.0
25.000 0.0

AVERAGE ANNUAL E/T

0.002 0.0

LOW HIGH

DAILY CHURNING FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.002 0.002

NATIONAL ANNUAL PRODUCTION (TONS)

0.202E+08

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.0
0.204
0.794
0.0
0.0

T OF SEC REPRESENTED BY PRODUCT

26.000

Power Systems Division

FCR-1333

PLANT SIC 2864 (NAPLINA PLANT)
TIME FRAME: 2000
TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(MT)
DAILY PLANT PRODUCTION(MT)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

ELECTRIC REQUIREMENTS
UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

INT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT/FUEL=0.0
USABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)

AVERAGE ANNUAL L/T

DAILY CORRECTION FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

NATIONAL ANNUAL PRODUCTION(MT)

FUEL BREAKDOWN FRACTIONS
COAL
OIL
NATURAL GAS
OTHER

T OF SIC REPRESENTED BY PRODUCT

NO. 14 SIC 2911 PETROLEUM REFINING

TIME FRAME: 1978

TYPICAL PLANT DATA

Power Systems Division

ANNUAL LAUNCH KILNS(BARRELS)
DAILY CRUDE KILNS(BARRELS)
PRODUCTIVE DAYS PER YEAR
MIN-PRODUCTIVE DAYS PER YEAR

547,000
16,743
327
30

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(MW/BARREL)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

PROD MIN-PROD
4.2 0.0
30,765 0.0
29,227 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/BARREL)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=2.00, FUEL=0.0
USABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)

140.0
3.0 0.0
500.0 0.0
700.0 0.0
0.424 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL E/I

0.027 0.0

LOW HIGH

DAILY CORRUPTION FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/I

1.000 1.000
0.027 0.027

NATIONAL ANNUAL PRODUCTION(BARRELS)

0.5265E+10

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.010
0.130
0.690
0.170
0.0

% OF SIC REPRESENTED BY PRODUCT

100.000

FCR-1333

NO. 14 JUL 2-81 PETROLEUM REFINERY

TIME FRAME: 1985

TYPICAL PLANT DATA

Power Systems Division

ANNUAL CRUDE RUNS (BARRELS) 6,475,600
 DAILY CRUDE RUNS (BARRELS) 19536
 PRODUCTIVE DAYS PER YEAR 327
 NON-PRODUCTIVE DAYS PER YEAR 30

ELECTRICAL REQUIREMENTS

	PROD	NON-PROD
UNIT ELECTRIC CONSUMPTION (MMH/BARREL)	4.1	0.0
PEAK ELECTRICAL DEMAND (MW)	34,957	0.0
AVERAGE ELECTRICAL DEMAND (MW)	33,204	0.0
ELECTRIC LOAD FACTOR (TYPICAL DAY)	0.950	0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/BARREL)

HOT WATER	100°F	0.0	0.0
400°F STEAM	300°F	0.0	0.0
400°F STEAM	500°F	0.096	0.0
700°F STEAM	700°F	0.0	0.0
UNIT HEAT (CLEAN=2.00, FILT=0.0)	900°F	0.414	0.0
USABLE PROCESS HEAT	0°F	0.0	0.0
PY-PRODUCT FUEL AVAILABLE (TYPE=0.0)		0.0	0.0
AVERAGE ANNUAL L/T		0.027	0.0

	LOW	HIGH
DAILY CORRELATION FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE L/T	0.027	0.027

NATIONAL ANNUAL PRODUCTION (BARRELS) 0.614E+10

FUEL BREAKDOWN FRACTIONS

COAL	0.020
UTIL	0.260
NATURAL GAS	0.550
OTHER	0.170
OTH: 4	0.0

% OF SEC REPRESENTED BY PRODUCT 100.000

FCR-1333

ORIGINAL PAGE IS
OF POOR QUALITY

NO. 14 SEC 2-10 FIRMING REFINING

TIME FRAME: 200-J

TYPICAL PLANT DATA

ANNUAL CRUDE PRODUCTION (BARRELS)
DAILY CRUDE RINGS (BARRELS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

7,000,000
22,242
327
30

ELECTRIC REQUIREMENTS

PROD. MIN. PROD.

UNIT ELECTRIC CONSUMPTION (MWH/BAWFL)
PEAK ELECTRICAL DEMAND (MW)
AVERAGE ELECTRICAL DEMAND (MW)
ELECTRIC LOAD FACTOR (TYPICAL DAY)

3.9 0.0
17,050 0.0
15,965 0.0
0.950 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/BAWFL)

HEAT WATER 150.0
300.0 F STEAM 300.0
500.0 F STEAM 500.0
700.0 F STEAM 700.0
DIRECT FUEL (LPG)-2.00, FUEL=0.0
INDIRECT FUEL (LPG)-0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0)

0.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL 1/1

0.027 0.0

LOW HIGH

DAILY COINCIDENT FACTOR NAME
SEASONAL VARIATION (DAILY AVERAGE E/T)

1.000 1.000
0.027 0.027

NATIONAL ANNUAL PRODUCTION (BARRELS)

0.702 18.10

FUEL REQUIREMENT FRACTIONS

COAL
OIL
NATURAL GAS
OTHER

0.120
0.220
0.640
0.000

1 OF SEC REPRESENTED BY PRODUCT

100.000

NY-20 SIC 3011 LINES

TIME FRAME: 1978.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 100000.
DAILY PLANT PRODUCTION(TONS) 385.
PRODUCTIVE DAYS PER YEAR 260.
NON-PRODUCTIVE DAYS PER YEAR 102.

ELECTRICAL REQUIREMENTS

	PROD	NON-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	898.0	192.0
PEAK ELECTRICAL DEMAND(MW)	16.930	7.618
AVERAGE ELECTRICAL DEMAND(MW)	14.590	7.618
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.850	1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	0.0	0.0
300 F STEAM	0.0	0.0
500 F STEAM	8.148	1.481
700 F STEAM	0.0	0.0
DIRECT HEAT(CLEAN=1.00, FUEL=1.00)	0.0	0.0
USEABLE PROCESS HEAT	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0
AVERAGE ANNUAL F/T	0.376	0.443

DAILY CORRELATION FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

	LOW	HIGH
	1.000	1.000
	0.376	0.376

NATIONAL ANNUAL PRODUCTION(TONS) 0.496E+07

FULL BREAKDOWN FRACTIONS

COAL	0.216
OIL	0.327
NATURAL GAS	0.440
OTHER	0.017
OTHER	0.0

T OF SIC REPRESENTED BY PRODUCT

81.000

FCR-1333

TYPICAL PLANT DATA

FCR-1333

OF SIC REPRESENTED BY PRODUCT

NO.20 SIC 3011 TINES

TIME FRAME: 2000.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 100.00
DAILY PLANT PRODUCTION(TONS) 395.
PRODUCTIVE DAYS PER YEAR 260.
NON-PRODUCTIVE DAYS PER YEAR 105.

ELECTRICAL REQUIREMENTS

	PROD	NON-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	624.1	143.0
PEAK ELECTRICAL DEMAND(MW)	11.766	5.676
AVERAGE ELECTRICAL DEMAND(MW)	10.001	5.676
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.850	1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	0.0	0.0
300 F STEAM	0.0	0.0
500 F STEAM	0.0	0.0
700 F STEAM	0.0	0.0
DIRECT HEAT(CLEAN=1.00, FUEL=1.00)	0.0	0.0
USEABLE PROCESS HEAT	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0

AVERAGE ANNUAL E/T

0.376 0.443

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.376 0.376

NATIONAL ANNUAL PRODUCTION(TONS)

0.654 (IF 407)

FUEL BREAKDOWN FRACTIONS

COAL	0.216
OIL	0.327
NATURAL GAS	0.440
OTHER	0.017
OTHER	0.0

T OF SIC REPRESENTED BY PRODUCT

11.000

FCR-1333

NU-21 SIC 221 CLASS CONTAINER

TIME FRAME: 1978.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 125,000
 DAILY PLANT PRODUCTION(TONS) 357.
 PRODUCTIVE DAYS PER YEAR 350.
 NON-PRODUCTIVE DAYS PER YEAR 15.

ELECTRIC LOAD REQUIREMENTS

	PROD	MIN-PRIM
UNIT ELECTRIC CONSUMPTION(KWH/TON)	328.2	0.0
PEAK ELECTRICAL DEMAND(MW)	5.526	0.0
AVERAGE ELECTRICAL DEMAND(MW)	4.883	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER	140.F	0.0	0.0
300 F STEAM	300.F	0.0	0.0
500 F STEAM	500.F	0.0	0.0
700 F STEAM	700.F	0.0	0.0
DIRECT HEAT CLEAN=2.00, FUEL=2.00	2800.F	9.900	0.0
USEABLE PROCESS HEAT	1000.F	1.400	0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=1.0)	0.0	0.0	0.0

AVERAGE ANNUAL E/T

	LOW	HIGH
AVERAGE ANNUAL E/T	0.113	0.0

DAILY CONCURRENCE FACTOR RANGE

	LOW	HIGH
DAILY CONCURRENCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T	0.113	0.113

NATIONAL ANNUAL PRODUCTION(TONS)

0.1360E+08

FUEL BREAKDOWN FRACTIONS

COAL	0.0
OIL	0.193
NATURAL GAS	0.807
OTHER	0.0
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT

100.000

NP-21 SIC 3221 CLASS CONTAIN-9

TIME FRAME: 1985.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 125000;
DAILY PLANT PRODUCTION(TONS) 357;
PRODUCTIVE DAYS PER YEAR 350;
NON-PRODUCTIVE DAYS PER YEAR 15;

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	283.0	0.0
PEAK ELECTRICAL DEMAND(MW)	4.679	0.0
AVERAGE ELECTRICAL DEMAND(MW)	4.211	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	140.0	0.0
300 F STEAM	300.0	0.0
500 F STEAM	500.0	0.0
700 F STEAM	700.0	0.0
DIRECT HEAT/FUEL=2.00, FUEL=2.00	2800.0	0.0
USEABLE PROCESS HEAT	1400.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)	0.0	0.0
AVERAGE ANNUAL E/T	0.113	0.0

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T 0.113 0.113

NATIONAL ANNUAL PRODUCTION(TONS)

	0.156	0.508
FUEL BREAKDOWN FRACTIONS		
COAL	0.0	
OIL	0.193	
NATURAL GAS	0.807	
OTHER	0.0	
OTHER	0.0	

% OF SIC REPRESENTED BY PRODUCT 100.000

FCR-1333

NO. 01 SIC 3221 GLASS CONTAINER

TIME FRAME: 2010.

TYPICAL PLANT DATA

Power Systems Division

ORIGINAL PAGE IS
OF POOR QUALITY

ANNUAL PLANT PRODUCTION(TONS) 125000.
DAILY PLANT PRODUCTION(TONS) 357.
PRODUCTIVE DAYS PER YEAR 350.
NON-PRODUCTIVE DAYS PER YEAR 15.

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT (ELECTRIC CONSUMPTION(KWH/TON))	263.0	0.0
PEAK ELECTRICAL DEMAND(MW)	4.349	0.0
AVERAGE ELECTRICAL DEMAND(MW)	3.914	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER	150.F	0.0	0.0
300 F STEAM	300.F	0.0	0.0
500 F STEAM	500.F	0.0	0.0
700 F STEAM	700.F	0.0	0.0
DIRECT HEAT CLEAN=2.00, FUEL=2.00	2020.F	7.732	0.0
USE HEAT PROCESS HEAT	1000.F	1.400	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)	0.0	0.0	0.0
AVERAGE ANNUAL E/T	0.116	0.0	

	LOW	HIGH
DAILY COINCIDENCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T	0.116	0.116

NATIONAL ANNUAL PRODUCTION(TONS) 0.195GE508

FUEL BREAKDOWN FRACTIONS

COAL	0.0
OIL	0.193
NATURAL GAS	0.807
OTHER	0.0
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT 100.000

FCR-1333

MT.22 SIC 3241 CEMENT - DRY

TIME FRAME: 1978.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 550,000
 DAILY PLANT PRODUCTION(TONS) 1507.
 PRODUCTIVE DAYS PER YEAR 365.
 MWI-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

	PROD	MW-PROD
UNIT ELECTRIC CONSUMPTION(KWH/TON)	137.7	0.0
PEAK ELECTRICAL DEMAND(MW)	9.606	0.0
AVERAGE ELECTRICAL DEMAND(MW)	8.646	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

	LOW	HIGH
HOT WATER	140.F	0.0
300 F STEAM	300.F	0.0
500 F STEAM	500.F	0.0
700 F STEAM	700.F	0.0
DIRECT HEAT CLEAN=2.00, FUEL=7.00	2900.F	0.0
USEABLE PROCESS HEAT	1.340	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0

AVERAGE ANNUAL F/T

	LOW	HIGH
	0.077	0.0

DAILY COINCIDENCE FACTOR RANGE
 SEASONAL VARIATION OF DAILY AVERAGE F/T

	LOW	HIGH
	1.000	1.000
	0.077	0.077

NATIONAL ANNUAL PRODUCTION(TONS)

0.3460E+08

FUEL BREAKDOWN FRACTIONS

COAL	0.480
OIL	0.095
NATURAL GAS	0.425
OTHER	0.0
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT

43.300

FCR-1333

WD.22 SIC 3241 CEMENT - UNY

TIME FRAME: 1975.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL "PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NUM-PRODUCTIVE DAYS PER YEAR

725000.
1975.
365.
0.

ELECTRIC REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

128.0 0.0
11.770 0.0
10.593 0.0
0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=2.00 FUEL=7.00
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE (TYPE=6.0)

140.0
300.0
500.0
700.0
2900.0
1.140 0.0
0.0 0.0

AVERAGE ANNUAL E/T

0.083 C.0

DAILY CONCURRENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.083 0.083

NATIONAL ANNUAL PRODUCTION(TONS)

0.420E+08

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.630
0.078
0.292
0.0
0.0

T OF SIC REPRESENTED BY PRODUCT

43.300

FCR-1333

NO. 22 SIC 3241 LUMINT - DMY

TIME FRAME: 200G.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 16,000.0
DAILY PLANT PRODUCTION(TONS) 4521.
PRODUCTIVE DAYS PER YEAR 365.
MAN-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRICAL CONSUMPTION(KWH/TON) 110.0 0.0
PEAK ELECTRICAL DEMAND(MW) 23,021 0.0
AVERAGE ELECTRICAL DEMAND(MW) 20,719 0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY) 0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 140.F 0.0 0.0
300 F STEAM 300.F 0.0 0.0
500 F STEAM 500.F 0.0 0.0
700 F STEAM 700.F 0.0 0.0
DIRECT HEAT CLEAN=2.00, FUEL=7.00 2900.F 0.0
USEABLE PROCESS HEAT 1240 0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0) 0.0 0.0

AVERAGE ANNUAL F/T

0.107 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T 0.107 0.107

NATIONAL ANNUAL PRODUCTIONS

0.524 0.008

FUEL REQUIREMENT FRACTIONS

COAL 0.940
OIL 0.040
NATURAL GAS 0.020
OTHER 0.0
OTHER 0.0

% OF SIC REPRESENTED BY PRODUCT

43.300

FCR-1333

Power Systems Division

FCR-1333

00123 SEC 333 INTEGRATED STEEL MILL

TIME FRAME: 1978.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

500000
13299
365
0

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

PROD NON-PROD
326.8 0.0
233.191 0.0
186.552 0.0
6.800 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
700 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=3.00 FUEL=7.00
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)
AVERAGE ANNUAL E/T

LOW HIGH
140.F 0.0 0.0
300.F 0.0 0.0
500.F 1.424 0.0
700.F 0.0 0.0
29.990 0.0
0.0 0.0
6.182 0.0
0.037 0.0

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

LOW HIGH
1.000 1.000
0.037 0.037

NATIONAL ANNUAL PRODUCTION(TONS)

FUEL REQUIREMENT FRACTIONS
COAL
OIL
NATURAL GAS
OTHER
OTHER

0.1421E+09
0.653
0.074
0.189
0.034
0.0

% OF SEC REPRESENTED BY PRODUCT

100.000

Power Systems Division

FCR-1333

NO.2) SIC 3312 INTEGRATED STEEL MILL

TIME FRAME: 1985.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 5000000.
DAILY PLANT PRODUCTION(TONS) 13699.
PRODUCTIVE DAYS PER YEAR 365.
NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON) 278.8 0.0
PEAK ELECTRICAL DEMAND(MW) 148.910 0.0
AVERAGE ELECTRICAL DEMAND(MW) 159.127 0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY) 0.800 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

100 F WATER 140 F 0.0 0.0
300 F STEAM 300 F 0.0 0.0
500 F STEAM 500 F 1.215 0.0
700 F STEAM 700 F 0.0 0.0
DIRECT HEAT CLEAN=3.60, FUEL=7.00 3000 F 24.640 0.0
USEABLE PROCESS HEAT 0 F 0.0 0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=1.0) 5.275 0.0

AVERAGE ANNUAL E/T C.037 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T C.037 0.037

NATIONAL ANNUAL PRODUCTION(TONS)

FUEL REQUIREMENT FRACTIONS 0.155E+09
COAL 0.653
OIL 0.076
NATURAL GAS 0.109
OTHER 0.004
OTHER 0.0

% OF SIC REPRESENTED BY PRODUCT 100.000

Power Systems Division

FCR-1333

ORIGINAL PAGE.
OF POOR QUALITY

MI-21 SIC 1312 INTEGRATED STEEL MILL
TIME FRAME: 20 Y.
TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

5000000
13495
365
0

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

262.4 0.0
187.249 0.0
149.742 0.0
0.200 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
HEATING FUEL=3.00 FUEL=7.00
STEAM PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE(TYPE=1.0)

100.0 0.0
300.0 0.0
500.0 0.0
700.0 0.0
23.200 0.0
0.0 0.0
4.966 0.0

AVERAGE ANNUAL E/I

0.037 0.0

DAILY COINCIDENT FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/I

LOW HIGH
1.000 1.000
0.037 0.037

NATIONAL ANNUAL PRODUCTION(TONS)

0.183E+09

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.653
0.074
0.189
0.084
0.0

T OF SIC REPRESENTED BY PRODUCT

100.000

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION (TUNNELS)	400,000
DAILY PLANT PRODUCTION (TUNNELS)	1,096
PRODUCTIVE DAYS PER YEAR	305
FORM-PRODUCTIVE DAYS PER YEAR	0

ELECTRICAL REQUIREMENTS		POWER	WATER
UNIT FLUORIC CONSUMPTION(KWH/TON)		841.2	0.0
PEAK ELECTRICAL DEMAND(MW)		45.109	0.0
AVERAGE ELECTRICAL DEMAND(MW)		30.411	0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY)		0.850	0.0

AVERAGE INTERNAL REQUIREMENTS (MILLION BTU/ION)

100T WATER	140.F	0.0	0.0
300 F STEAM	300.F	0.077	0.0
500 F STEAM	500.F	0.0	0.0
700 F STEAM	700.F	0.0	0.0
DIRECT FUEL CLEAN=3.00,FUEL=0.0	3000.F	0.202	0.0
USABLE PROCESS HEAT	0.F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0)		0.0	0.0
AVERAGE ANNUAL E/I		0.247	0.0

	LOW	HIGH
DAILY CLIMB DANCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE EAT	0.347	0.347

NATIONAL ANNUAL PRODUCTION/TONS **0.741M:07**

FUEL INFEEDING FRACTIONS	
COAL	0.012
OIL	0.025
NATURAL GAS	0.450
OTHER	0.504
TOTAL	0.0

2 OF SIC REPRESENTED BY PRODUCT 100.000

NO. 14 SEC 3321 MAY 1974 FIDELITY

TIME FRAME: 1975.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION (TONS)
DAILY PLANT PRODUCTION (TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

400000
1096
362
0

ELECTRICAL REQUIREMENTS

7400 MIN-PROD

UNIT ELECTRIC CONSUMPTION (KWH/TON)
PEAK ELECTRICAL DEMAND (MW)
AVERAGE ELECTRICAL DEMAND (MW)
ELECTRIC LOAD FACTOR (TYPICAL DAYS)

644.5 0.0
35.700 0.0
10.344 0.0
0.856 0.0

AVERAGE THERMAL REQUIREMENTS (MILLION BTU/TON)

HOT WATER 150-F
100 F STEAM 350-F
500 F STEAM 500-F
700 F STEAM 700-F
DIRECT HEAT EXCHANGER 1.00 FUEL=0.0
HEAT EXCHANGER PROCESS HEAT 0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0)

0.0 0.0
0.061 0.0
0.0 0.0
0.0 0.0
6.430 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL L/T

0.347 0.0

LOW HIGH

DAILY EFFICIENCY FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.347 0.347

NATIONAL ANNUAL PRODUCTION (TONS)

0.976E+07

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER

0.012
0.025
0.499
0.506
0.0

% OF SEC REPRESENTED BY PRODUCT

100.000

FCR-1339

HO-24 SIC 2021 GRAY IRON FOUNDRY

TIME FRAME: 2000.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

400000.
1096.
365.
0.

Power Systems Division

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

588.2 0.0
11.632 0.0
27.887 0.0
0.850 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT CLEAN=3.00,FUEL=0.0)
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0)

140.2 0.0 0.0
360.2 0.0 0.0
500.2 0.0 0.0
700.2 0.0 0.0
5.741 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL F/T

0.347 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.347 0.347

NATIONAL ANNUAL PRODUCTION(TONS)

0.1314E+08

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.012
0.025
0.450
0.504
0.0

% OF SIC REPRESENTED BY PRODUCT

100.000

FCR-1333

Power Systems Division

NO. 25 SIC 3311 COPPER (ARBITER PROCESS)

TIME FRAME: 1970.

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS) 36000.
 DAILY PLANT PRODUCTION(TONS) 99.
 PRODUCTIVE DAYS PER YEAR 365.
 NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS

UNIT ELECTRIC CONSUMPTION(KWH/TON) 2432.0 0.0
 PEAK ELECTRICAL DEMAND(MW) 11.105 0.0
 AVERAGE ELECTRICAL DEMAND(MW) 9.994 0.0
 ELECTRICAL LOAD FACTOR(TYPICAL DAY) 0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 140.F 0.0 0.0
 300 F STEAM 3.0.F 0.0 0.0
 500 F STEAM 3.8.F 24.700 0.0
 700 F STEAM 7.0.F 0.0 0.0
 DIRECT HEAT(CLEAN=2.00,FUEL=0.0) 0.F 0.0 0.0
 USABLE PROCESS HEAT 0.F 0.0 0.0
 BY-PRODUCT FUEL AVAILABLE(TYPE=0.0) 0.0 0.0 0.0
 AVERAGE ANNUAL E/T 0.336 0.0

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
 SEASONAL VARIATION OF DAILY AVERAGE E/T 0.336 0.336

NATIONAL ANNUAL PRODUCTION(TONS)

0.1627E+07

FUEL BREAKDOWN FRACTIONS

COAL 0.0
 OIL 0.0
 NATURAL GAS 1.000
 OTHER 0.0
 OTHER 0.0

% OF SIC REPRESENTED BY PRODUCT

1.000

FCR-1333

NO.25 SIC 1331 (UPPER (ARTIFICIAL PRESS))

TIME FRAME: 1945.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(TONS) 26,000.
DAILY PLANT PRODUCTION(TONS) 59.
PRODUCTIVE DAYS PER YEAR 365.
NON-PRODUCTIVE DAYS PER YEAR 0.

ELECTRICAL REQUIREMENTS PROD NON-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON) 2432.0 0.0
PEAK ELECTRICAL DEMAND(MW) 11.165 0.0
AVERAGE ELECTRICAL DEMAND(MW) 9.994 0.0
ELECTRIC LOAD FACTOR(TYPICAL DAY) 0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER 140.F 0.0 0.0
300 F STEAM 300.F 0.0 0.0
500 F STEAM 338.F 24,700 0.0
700 F STEAM 760.F 0.0 0.0
DIRECT HEAT(CLEAN 2.00, FUEL=0.0) 0.F 0.0 0.0
USEABLE PROCESS HEAT 0.F 0.0 0.0
BY-PRODUCT FUEL AVAILABLE (TYPE=0.0) 0.0 0.0 0.0

AVERAGE ANNUAL E/T 0.336 0.0

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
SEASONAL VARIATION OF DAILY AVERAGE E/T 0.336 0.336

NATIONAL ANNUAL PRODUCTION(TONS) 0.2700E+07

FUEL USE/ANNUAL FRACTIONS

COAL 0.0
OIL 0.0
NATURAL GAS 1.000
OTHER 0.0
OTHER 0.0

% OF SIC REPRESENTED BY PRODUCT 1.000

FCR-1333

Power Systems Division

FCR-1333

NO. 15 SIC 3331 (UPPER TARIFF PROCESS)

TIME FRAME: 2010

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(TONS)
DAILY PLANT PRODUCTION(TONS)
PRODUCTIVE DAYS PER YEAR
NON-PRODUCTIVE DAYS PER YEAR

36000
99
365
0

ELECTRICAL REQUIREMENTS

PROD MIN-PROD

UNIT ELECTRIC CONSUMPTION(KWH/TON)
PEAK ELECTRICAL DEMAND(MW)
AVERAGE ELECTRICAL DEMAND(MW)
ELECTRIC LOAD FACTOR(TYPICAL DAY)

2256.0 0.0
10.302 0.0
9.271 0.0
0.900 0.0

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/TON)

HOT WATER
300 F STEAM
500 F STEAM
700 F STEAM
DIRECT HEAT(CLEAN=2.00, FUEL=0.0)
USEABLE PROCESS HEAT
BY-PRODUCT FUEL AVAILABILITY(TYPE=0.0)

140.0 0.0
300.0 0.0
310.0 0.0
700.0 0.0
0.0 0.0
0.0 0.0
0.0 0.0

AVERAGE ANNUAL E/T

0.657 0.0

LOW HIGH

DAILY COEFFICIENT FACTOR RANGE
SEASONAL VARIATION OF DAILY AVERAGE E/T

1.000 1.000
0.657 0.657

NATIONAL ANNUAL PRODUCTION(TONS)

0.4200E+07

FUEL BREAKDOWN FRACTIONS

COAL
OIL
NATURAL GAS
OTHER
OTHER

0.0
0.0
1.000
0.0
0.0

% OF SIC REPRESENTED BY PRODUCT

1.000

NO. 26 SIC 3711 MOTOR VEHICLES

TIME FRAME: 1978.

TYPICAL PLANT DATA

Power Systems Division

ANNUAL PLANT PRODUCTION(AUTOS) 210000.
DAILY PLANT PRODUCTION(AUTOS) 608.
PRODUCTIVE DAYS PER YEAR 260.
NON-PRODUCTIVE DAYS PER YEAR 105.

ELECTRIC REQUIREMENTS	PROD	MIN-PROD
UNIT ELECTRIC CONSUMPTION(KWH/AUTO)	631.8	56.7
PEAK ELECTRICAL DEMAND(MW)	23.626	4.725
AVERAGE ELECTRICAL DEMAND(MW)	31.264	4.725
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/AUTO)

HOT WATER	150. F	0.0	0.0
300 F STEAM	300. F	0.0	0.0
500 F STEAM	353. F	5.311	0.429
700 F STEAM	730. F	0.0	0.0
DIRECT HEAT(CLEAN=1.00, FUEL=1.00)	3000. F	1.869	0.151
USABLE PROCESS HEAT	0. F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0	0.0

AVERAGE ANNUAL E/T 0.300 0.334

DAILY COINCIDENCE FACTOR RANGE	LOW	HIGH
SEASONAL VARIATION OF DAILY AVERAGE E/T	1.000	1.000
	0.300	0.300

NATIONAL ANNUAL PRODUCTION(AUTOS) 0.1235E+08

FUEL BREAKDOWN FRACTIONS

COAL	0.244
OIL	0.122
NATURAL GAS	0.528
OTHER	0.106
	0.0

% OF SIC REPRESENTED BY PRODUCT 100.000

ORIGINAL PAGE IS
OF POOR QUALITY

FCR-1333

NO. 26 SIC 1711 MOTOR VEHICLES

TIME FRAME: 1985.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(AUTOS) 210000.
 DAILY PLANT PRODUCTION(AUTOS) 808.
 PRODUCTIVE DAYS PER YEAR 260.
 NON-PRODUCTIVE DAYS PER YEAR 105.

ELECTRICAL REQUIREMENTS

	PROD	MIN	PROD
UNIT ELECTRIC CONSUMPTION(KWH/AUTO)	561.1	50.4	
PEAK ELECTRICAL DEMAND(MW)	20.980	4.196	
AVERAGE ELECTRICAL DEMAND(MW)	16.882	4.196	
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	1.000	

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/AUTO)

INLET WATER	140.F	0.0	0.0
500 F STEAM	300.F	0.0	0.0
500 F STEAM	300.F	4.716	0.381
700 F STEAM	700.F	0.0	0.0
DIRECT HEAT CLAN=1.00, FUEL=1.00	3000.F	1.659	0.134
USEABLE PROCESS HEAT	0.F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=NG)	0.0	0.0	0.0
AVERAGE ANNUAL L/T		0.360	0.334

	LOW	HIGH
DAILY COINCIDENCE FACTOR RANGE	1.000	1.000
SEASONAL VARIATION OF DAILY AVERAGE L/T	0.300	0.300

NATIONAL ANNUAL PRODUCTION(AUTOS) 0.1373E09

FUEL BREAKDOWN FRACTIONS

COAL	0.244
OIL	0.122
NATURAL GAS	0.528
OTHER	0.106
	0.6

% OF SIC REPRESENTED BY PRODUCT 100.000

FCR-1333

NO. 76 SIC 211 MOTOR VEHICLES

TIME FRAME: 2000.

Power Systems Division

TYPICAL PLANT DATA

ANNUAL PLANT PRODUCTION(AUTOS) 210000.
 DAILY PLANT PRODUCTION(AUTOS) 809.
 PRODUCTIVE DAYS PER YEAR 260.
 MIN-PRODUCTIVE DAYS PER YEAR 105.

ELECTRICAL REQUIREMENTS

	PROD	MIN-PROD
UNIT ELECTRIC CONSUMPTION(KWH/AUTO)	466.3	41.8
PEAK ELECTRICAL DEMAND(MW)	17.436	3.487
AVERAGE ELECTRICAL DEMAND(MW)	15.692	3.487
ELECTRIC LOAD FACTOR(TYPICAL DAY)	0.900	1.000

AVERAGE THERMAL REQUIREMENTS(MILLION BTU/AUTO)

HOT WATER	140.F	0.0	0.0
300 F STEAM	300.F	0.0	0.0
500 F STEAM	353.F	3.919	0.317
700 F STEAM	700.F	0.0	0.0
DIRECT HEAT(CLEAN=1.00, FUEL=1.00)	3000.F	1.379	0.111
USEABLE PROCESS HEAT	0.F	0.0	0.0
BY-PRODUCT FUEL AVAILABLE(TYPE=0.0)	0.0	0.0	0.0
AVERAGE ANNUAL F/T	0.300	0.334	

LOW HIGH

DAILY COINCIDENCE FACTOR RANGE 1.000 1.000
 SEASONAL VARIATION OF DAILY AVERAGE F/T 0.300 0.300

NATIONAL ANNUAL PRODUCTION(AUTOS) 0.173E+08

FUEL BREAKDOWN FRACTIONS

COAL	0.244
OIL	0.122
NATURAL GAS	0.528
OTHER	0.106
OTHER	0.0

% OF SIC REPRESENTED BY PRODUCT 100.000

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